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New Staphylinidae (Coleoptera) records with new collection data from New Brunswick, Canada. I. Aleocharinae

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Abstract

Forty-eight species of Aleocharinae are newly reported from New Brunswick, bringing the total number of species known from the province to 149. Two of these species, *Ocyusa asperula* Casey and *Myllaena kaskaskia* Klimaszewski, are newly recorded for Canada. Additional locality data are presented for nine species recently recorded from the province. Collection and bionomic data for all these species are presented and discussed. Colour habitus images are presented for all species included in this paper and genital images are presented for closely related *Myllaena kaskaskia* Klimaszewski, *M. procidua* Casey and *M. vulpina* Bernhauer. Photographs of the male genitalia of *M. procidua* are presented for the first time. The female spermatheca, tergite and sternite eight of *Amarochara formicina* Assing are illustrated for the first time.

Keywords

Staphylinidae, Aleocharinae, taxonomy, Canada, New Brunswick

Introduction

Intensive collecting of rove beetles (family Staphylinidae) in New Brunswick since 2004 by the first author has yielded many new provincial and national records. These records

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will be published in a series of papers, each focusing on one or more subfamilies of rove beetles. The goal of this first contribution in this series is to publish new collection and bionomic data on species of Aleocharinae and to provide additional records for some species recently reported from New Brunswick by Majka and Klimaszewski (2008b).

Rove beetles, along with weevils, leaf beetles, and the ground beetles, are one of the most speciose and biologically diverse of beetle families (Klimaszewski 2000; Gouix and Klimaszewski 2007). The world fauna includes over 46,200 known rove beetle species, classified in some 3,200 genera (Newton et al. 2001). In Canada and Alaska, 1,374 species of rove beetles in 274 genera and 23 subfamilies were reported by Klimaszewski (2000). However, many groups of rove beetles, and particularly the Aleocharinae, have been the subject of intensive studies in recent years by Klimaszewski and collaborators, and the number of described and documented rove beetle species in Canada and Alaska now exceeds 1,400.

The majority of adult rove beetle species occur in organic litter and prefer moist habitats. The aleocharines are generalist predators on other arthropods, but some groups/species are specialized in utilizing other food resources (Seevers 1978; Newton 1984; Ashe 1984, 2001; Klimaszewski 2000). Larvae of *Aleochara* species are ectoparasitoids on pupae of cyclorrhaphous Diptera (Klimaszewski 1984). Some species occur and prey on insects under the bark of trees or logs (e.g., *Homalota*, *Dexiogyia*, *Gnathusa*). Many species are associated with ants (some members of the tribes Athetini, Oxypodini and Lomechusini). The primary trophic affiliations of adults and larvae of rove beetles are discussed by Klimaszewski (2000). Rove beetles occur in most terrestrial habitats, but are best represented in forest litter and wetland environments.

Aleocharines represent one of the largest and most taxonomically diverse lineages of the rove beetles. There are at least 52 tribes, 1,000 genera, and over 12,000 described species worldwide (Seevers 1978; Ashe 2001; Klimaszewski 2000). There are probably thousands of species still to be discovered throughout the world. Gouix and Klimaszewski (2007), in the first comprehensive catalogue of aleocharine rove beetles from Canada and Alaska, reported 392 valid species classified in 92 genera and 14 tribes [Table 2 and Annex 3 in Gouix and Klimaszewski (2007)]. Since the publication of this catalogue, 42 aleocharine rove beetles species have been added to the Canadian faunal list as the result of descriptions of new species (13) and additions of species not previously known from Canada (29) (Assing 2008; Klimaszewski et al. 2007a, 2008a, 2008b, 2008c; Majka et al. 2008b, 2008c; Majka and Klimaszewski 2008a, 2008b, 2008c, 2008d), bringing the total number of species known from Canada to 434, but the true number of aleocharines in Canada may exceed 500.

Gouix and Klimaszewski (2007) reported 73 species of aleocharine rove beetle species from New Brunswick, including two species [*Amarochara formicina* Assing and *A. inquilina* (Casey)] reported by Assing (2007) after completion of the proofs and were not included in the main body of the text of the catalogue. Since the publication of the catalogue, 18 additional species have been reported from New Brunswick as the result of recent reviews of Canadian genera by Klimaszewski et al. (2008b) (*Gnypeta caerulea* (C.R. Sahlberg), *G. carbonaria* (Mannerheim), *G. nigrella* (LeConte), *G. saccharina* Klimaszewski and Webster, *G. minuta* Klimaszewski and Webster), Assing (2008) (*Calodera parviceps*

(Casey)), and the publication of new records by Majka and Klimaszewski (2008a) (*Atheta* (*Datomicra*) *celata* (Erichson)), Majka and Klimaszewski (2008b) (*Gymnusa grandiceps* Casey, *Meronera venustula* (Erichson), *Leptusa opaca* Casey [reported in Klimaszewski et al. (2004), but not in Gouix and Klimaszewski (2007)], *Atheta annexa* Casey, *Atheta novaescotiae* Klimaszewski and Majka, *Atheta* (*Dimetrota*) *burwelli* (Lohse), *Atheta* (*Dimetrota*) *hampshirensis* Bernhauer, *Atheta* (*Dimetrota*) *prudhoensis* (Lohse), *Atheta* (*Pseudota*) *klagesi* Bernhauer) and Klimaszewski et al. (2008c) (*Diglotta mersa* (Haliday), *Halobrecta flavipes* Thomson), bringing the total number of species recorded from New Brunswick to 91. Together with the data reported in the present paper, this number increases to 149.

Methods and conventions

Collection Methods. A variety of collection methods were employed by the senior author to collect the Aleocharinae reported in this study. Most of these are described in Appendix A. All specimens listed in this paper were collected by R.P. Webster, unless noted differently.

Specimen Preparation. More than 590 adult specimens of rove beetles were examined and most specimens were dissected. The genital structures were dehydrated in absolute alcohol and mounted in Canada balsam on celluloid microslides and pinned with the specimens from which they originated. The photographs were taken using an image processing system (Nikon SMZ 1500 stereoscopic microscope; Nikon Digital Camera DXM 1200F; and Adobe Photoshop software).

Terminology mainly follows that used by Seevers (1978). The ventral part of the median lobe of the aedeagus is considered to be the part of the bulbus containing the foramen mediale, the entrance of the ductus ejaculatorius, and the adjacent venter of the tubus; the opposite side is referred to as the dorsal part.

Distribution. Distribution maps, created using ArcMap and ArcGIS, are presented for each species in New Brunswick. Every species is cited with the current distribution in Canada and Alaska, using abbreviations for the state, provinces and territories. New provincial records are indicated in bold under Distribution in Canada and Alaska. The following abbreviations are used in the text:

AK	Alaska	**MB**	Manitoba
YT	Yukon Territory	**ON**	Ontario
NT	Northwest Territories	**QC**	Quebec
NU	Nunavut	**NB**	New Brunswick
BC	British Columbia	**PE**	Prince Edward Island
AB	Alberta	**NS**	Nova Scotia
SK	Saskatchewan	**NF & LB**	Newfoundland and Labrador

Acronyms of collections examined and referred to in this study are as follows:

AFC Atlantic Forestry Centre, Fredericton, New Brunswick

CNC	Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario
LFC	Laurentian Forestry Centre, Quebec, Quebec
NBM	New Brunswick Museum, Saint John, New Brunswick
RWC	Reginald Webster Collection, Charters Settlement, New Brunswick

Results

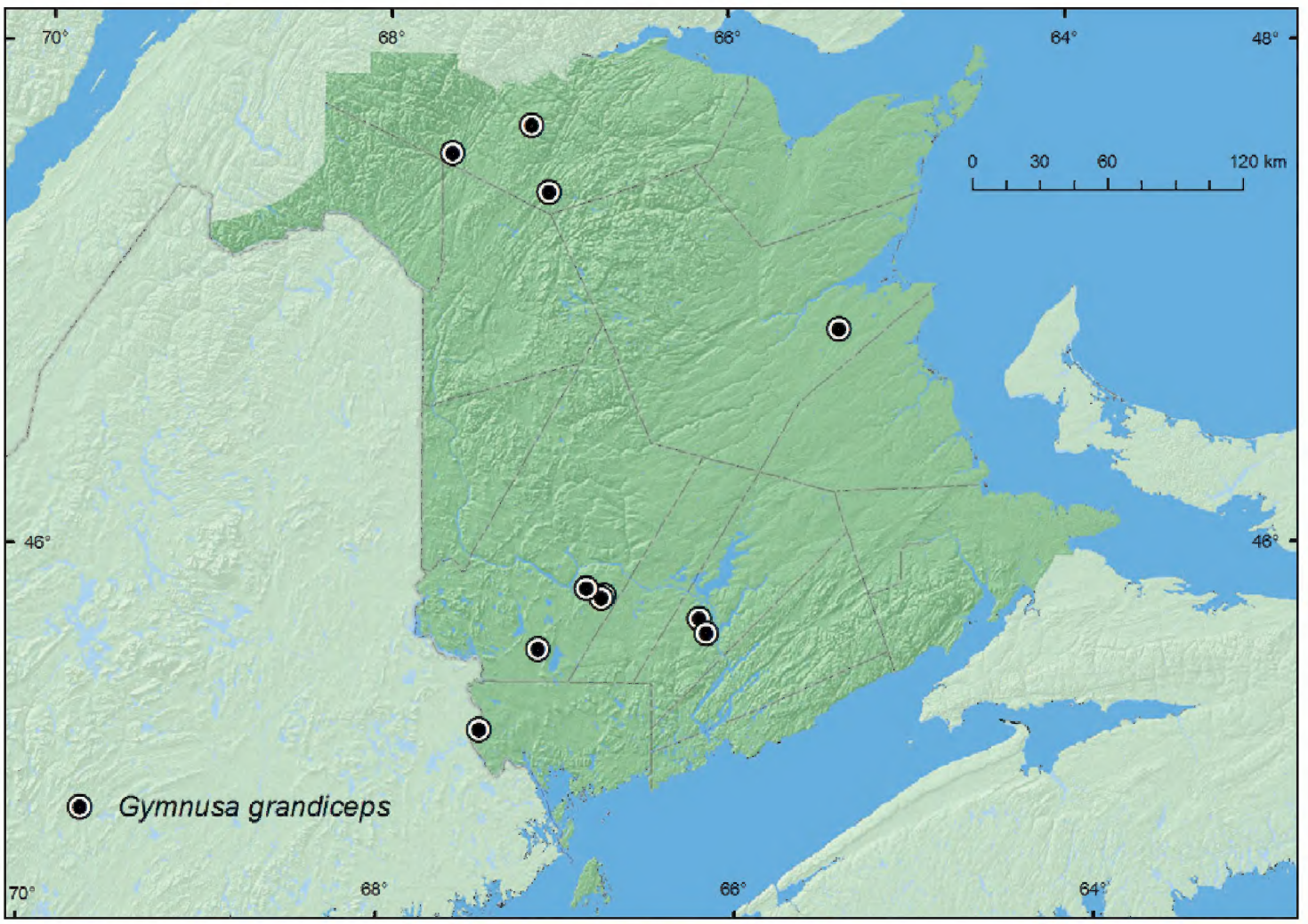
Forty-eight species are newly reported from New Brunswick bringing the total number of species known from the province to 149. Two of these species, *Ocyusa asperula* Casey and *Myllaena kaskaskia* Klimaszewski, are newly recorded for Canada. Additional locality data are presented for nine species recently recorded from the province.

Species accounts

Aleocharinae
Tribe Gymnusini Thomson, 1867
***Gymnusa grandiceps* Casey, 1915**
Fig 1, Map 1

Additional Records. CANADA, New Brunswick, Charlotte Co., 3.0 km NW of Pomeroy Ridge, 45.3059°N, 67.4343°W, 5.VI.2008 (1 sex undetermined, NBM). **Northumberland Co.**, 12 km SSE of Upper Napan, 46.8991°N, 65.3682°W, 7.VI.2006 (1 ♂, RWC). **Queens Co.**, ca. 3.5 km W of Lower Gagetown, 45.7497°N, 66.1846°W, 13.V.2008 (1 sex undetermined, NBM); near Queenstown, 45.6904°N, 66.1455°W, 13.V.2008 (1 sex undetermined, NBM). **Restigouche Co.**, near Little Tobique River, 47.4503°N, 67.0583°W, 13.VI.2006 (1 ♂, RWC); MacFarlane Brook PNA (Protected Natural Area), 47.6018°N, 67.6263°W, 25.V.2007 (1 ♀, RWC); Jacquet River Gorge PNA, 47.7146°N, 67.1644°W, 24.VI.2008 (2 ♀, NBM, RWC). **York Co.**, Charters Settlement, 45.8428°N, 66.7279°W, 15.IV.2005 (2 sex undetermined, NBM, RWC); Charters Settlement, 45.8341°N, 66.7445°W, 27.IV.2005, 27.IV.2006 (3 sex undetermined, LFC, NBM, RWC); same locality, 22.IV.2005 (1 ♀, 1 sex undetermined); 2.2 km S of Thomaston Corner, 45.6281°N, 67.1044°W, 3.VI.2005 (1 sex undetermined); Mazerolle Settlement, 45.8717°N, 66.8273°W, 28.IV.2006 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, *G. grandiceps* occurs in a variety of wet forested biotypes, including forested black spruce (*Picea mariana* (Mill.) BSP) bogs (often in lagg zone portion of bogs), alder (*Alnus* sp.) swamps, and eastern white cedar (*Thuja occidentalis* L.) swamps and forests. Adults typically were found in moist leaf litter and/or moss (usually on muddy soils) along margins of vernal ponds, in seepage areas, or near small brooks, often under alders. Adults were collected by sifting litter from these



Map 1. Collection localities in New Brunswick, Canada of *Gymnusa grandiceps.*

habitats. Little was previously known about the habitat of this species. Specimens were collected during April, May, and June. Collection method: sifting.

Distribution in Canada and Alaska. MB, ON, QC, NB, NS, NF & LB (Klimaszewski 1979; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b).

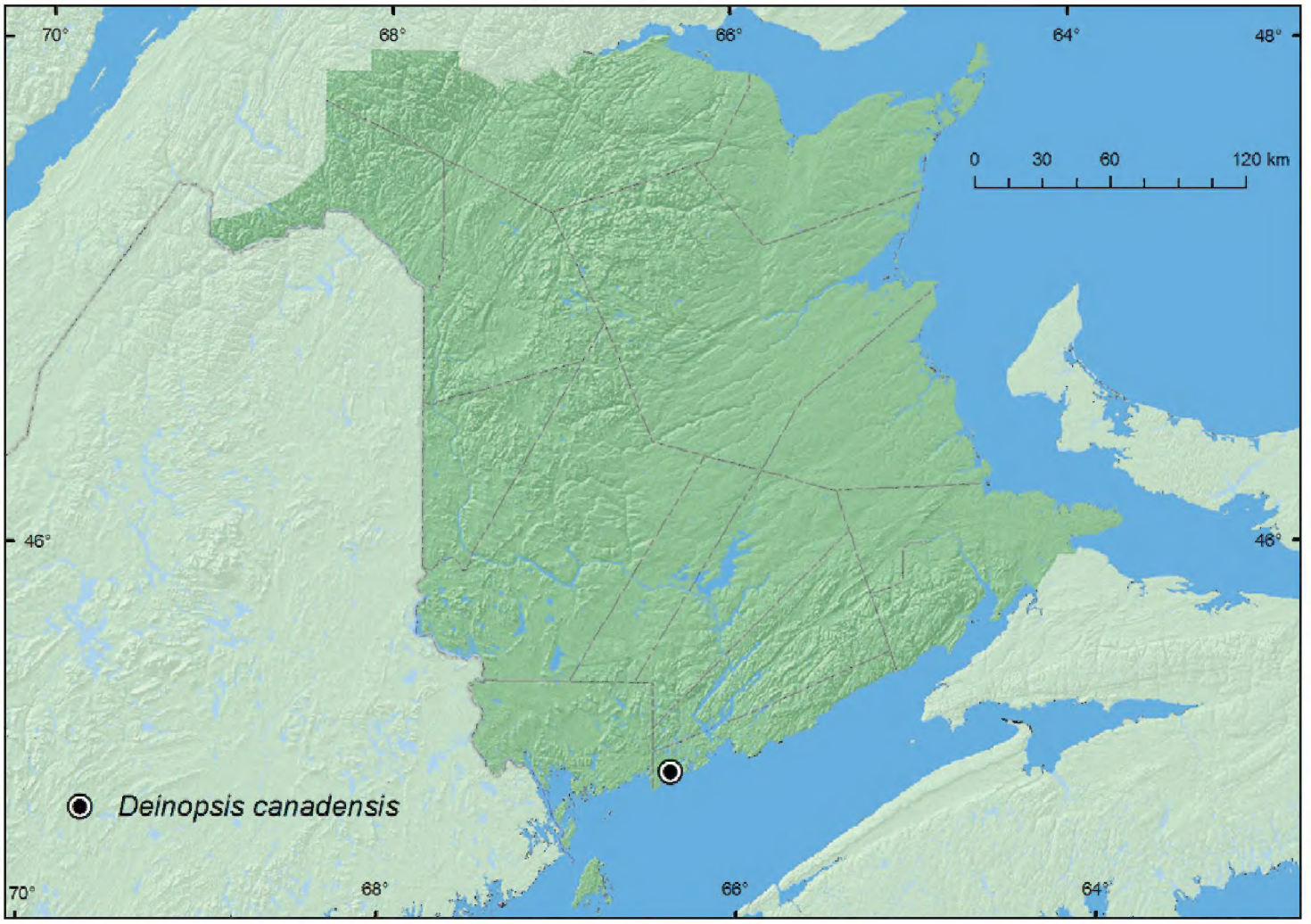
Gymnusa grandiceps was first reported from New Brunswick in Majka and Klimaszewski (2008b) from a specimen collected by R.P. Webster in Charters Settlement, NB. The records reported here indicate that *G. grandiceps* is widespread in New Brunswick.

Tribe Deinopsini Sharp, 1883
***Deinopsis canadensis* Klimaszewski, 1979**
Fig 2, Map 2

New Records. CANADA, New Brunswick, Saint John Co., Chance Harbour off Rt. 790, 45.1374°N, 66.3633°W, 15.V.2006, 30.V.2006 (3 ♂, 4 ♀, 3 sex undetermined, RWC).

Bionomic Notes. In New Brunswick, *D. canadensis* was collected near the margin of a black spruce bog by treading a floating mat of saturated green sphagnum into water. This species was reported from similar habitats in Ontario (Klimaszewski 1979). Adults were collected during May. Collection method: treading.

Figures 1–6. 1 *Gymnusa grandiceps* **2** *Deinopsis canadensis* **3** *D. rhadina* **4** *Aleochara villosa* **5** *A. inexpectata* **6** *A. lanuginosa* [2, 4, 5, apical part of abdomen removed]. Scale = 1 mm



Map 2. Collection localities in New Brunswick, Canada of *Deinopsis canadensis*.

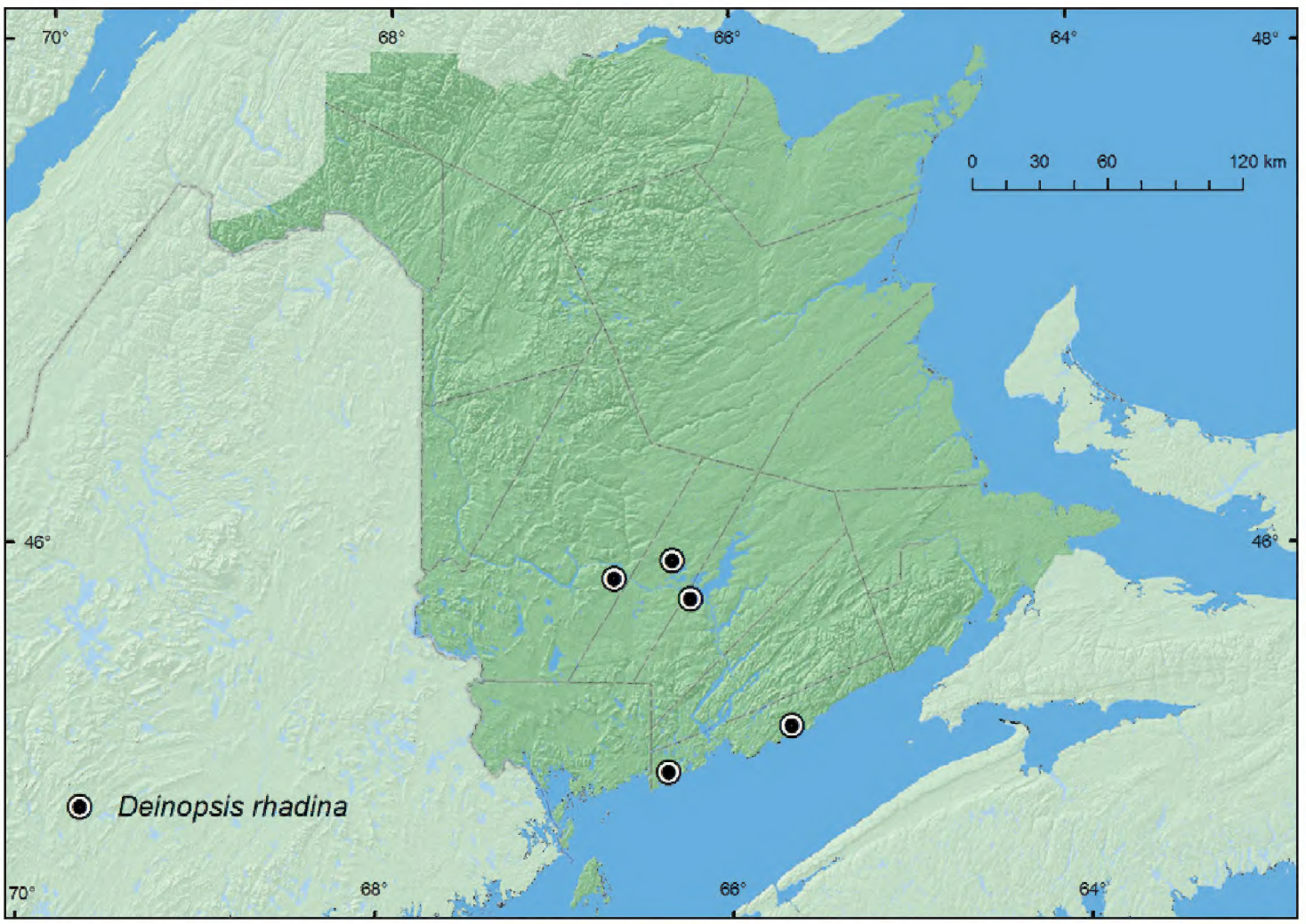
Distribution in Canada and Alaska. NB, ON (Klimaszewski 1979; Gouix and Klimaszewski 2007).

Deinopsis rhadina Klimaszewski, 1979

Fig 3, Map 3

New Records. CANADA, New Brunswick, Queens Co. Upper Gagetown, bog adjacent to Hwy 2 (Trans-Canada Hwy), 45.8316°N, 66.2346°W, 3.IV.2006 (1 ♂, 2 ♀, RWC). **Saint John Co.**, Bains Corner, 45.3235°N, 65.6654°W, 26.V.2006 (1 ♂, RWC). **Sunbury Co.**, Acadia Research Forest, 45.9816°N, 66.3374°W, 18.VII.2007, 18.IX.2007 (3 ♂, AFC, RWC). **York Co.** bog E. of New Maryland, 45.9110°N, 66.6688°W, 4.VI.2004 (1 ♀, RWC); Upper Brockway, 45.1374°N, 66.3633°W, 23.IV.2006 (2 ♂, RWC).

Bionomic Notes. Most specimens of *D. rhadina* were collected from sphagnum in tamarack (*Larix laricina* (Du Roi) Koch) or black spruce bogs, usually near the margin of the open portion of the bogs, although a few adults were found in saturated sphagnum in a forested black spruce bog. At the Acadia Research Forest, *D. rhadina* were collected from sphagnum and leaf litter at the bottom of old tire depressions in a regenerating mixed forest. During the spring and early summer these depressions are normally partially filled with water. Forested bog habitats occurred near this site. Adults were sifted from sphagnum



Map 3. Collection localities in New Brunswick, Canada of *Deinopsis rhadina*.

hummocks or were collected by treading saturated sphagnum. Adults were collected in April, May, June, July, and September and probably overwinter as adults. Nothing was previously known about the bionomics of this species. Collection method: sifting, treading.

Distribution in Canada and Alaska. NB, ON (Klimaszewski 1979; Gouix and Klimaszewski 2007).

Deinopsis rhadina was previously known only from the type locality in Alfred, Ontario, Canada.

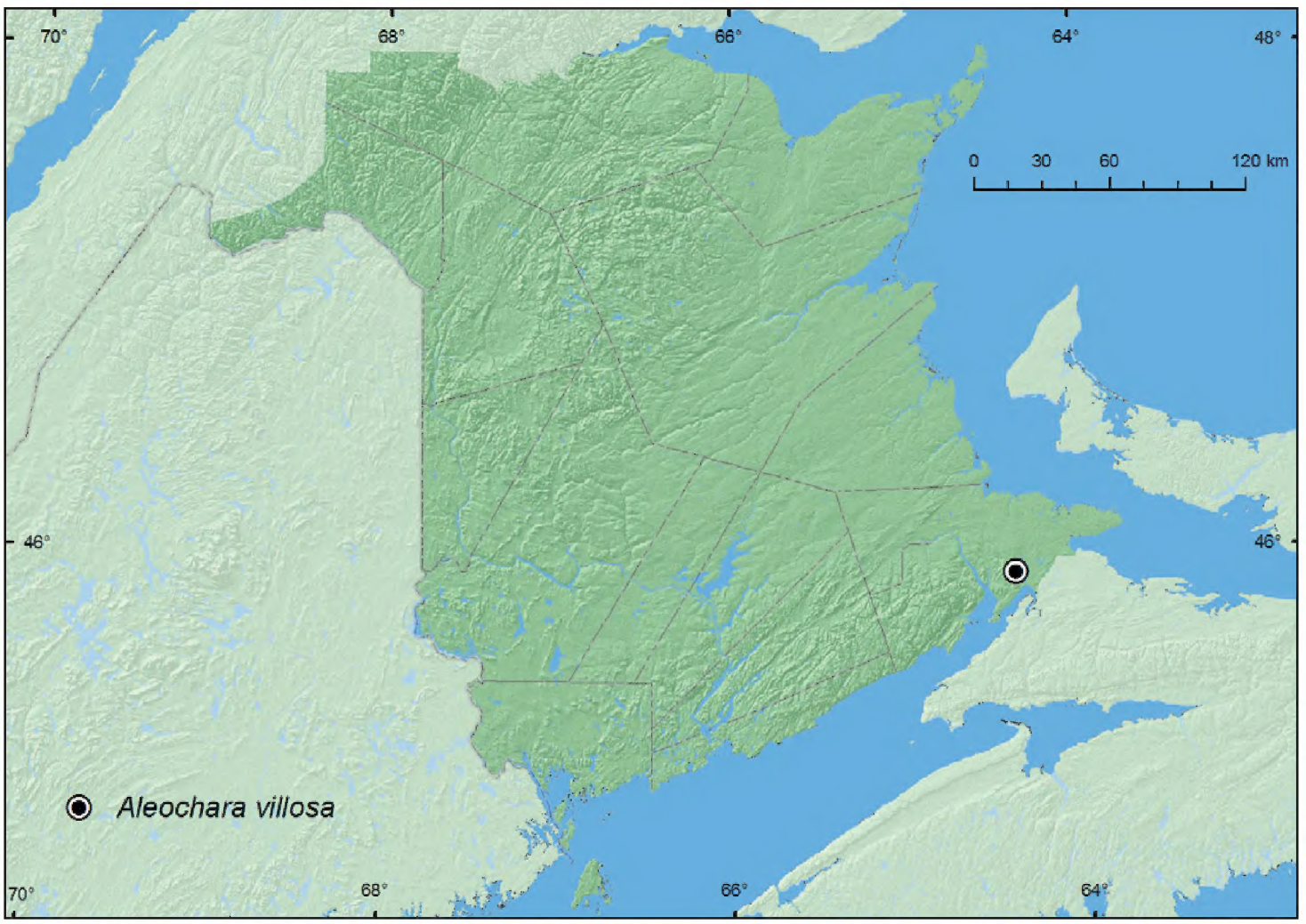
Tribe Aleocharini Fleming, 1821

***Aleochara* (*Calochara*) *villosa* Mannerheim, 1830**

Fig 4, Map 4

New Records. CANADA, New Brunswick, Westmorland Co., Sackville, near Ogden Mill, 45.92155°N, 64.38925°W, 12.V.2006, S. Makepeace (2 ♂, 1 ♀, LFC, RWC).

Bionomic Notes. In New Brunswick, *A. villosa* was collected from the nest contents of a great horned owl, *Bubo virginianus* (Gmelin). Little is known about the bionomics of this adventive species. Elsewhere, specimens have been collected from carrion and sifting an old hay pile (Klimaszewski 1984). Adults were collected in May. Collection method: sifting.



Map 4. Collection localities in New Brunswick, Canada of *Aleochara villosa*.

Distribution in Canada and Alaska. AK, BC, AB, QC, **NB** (Klimaszewski 1984; Klimaszewski and Génier 1987; Gouix and Klimaszewski 2007).

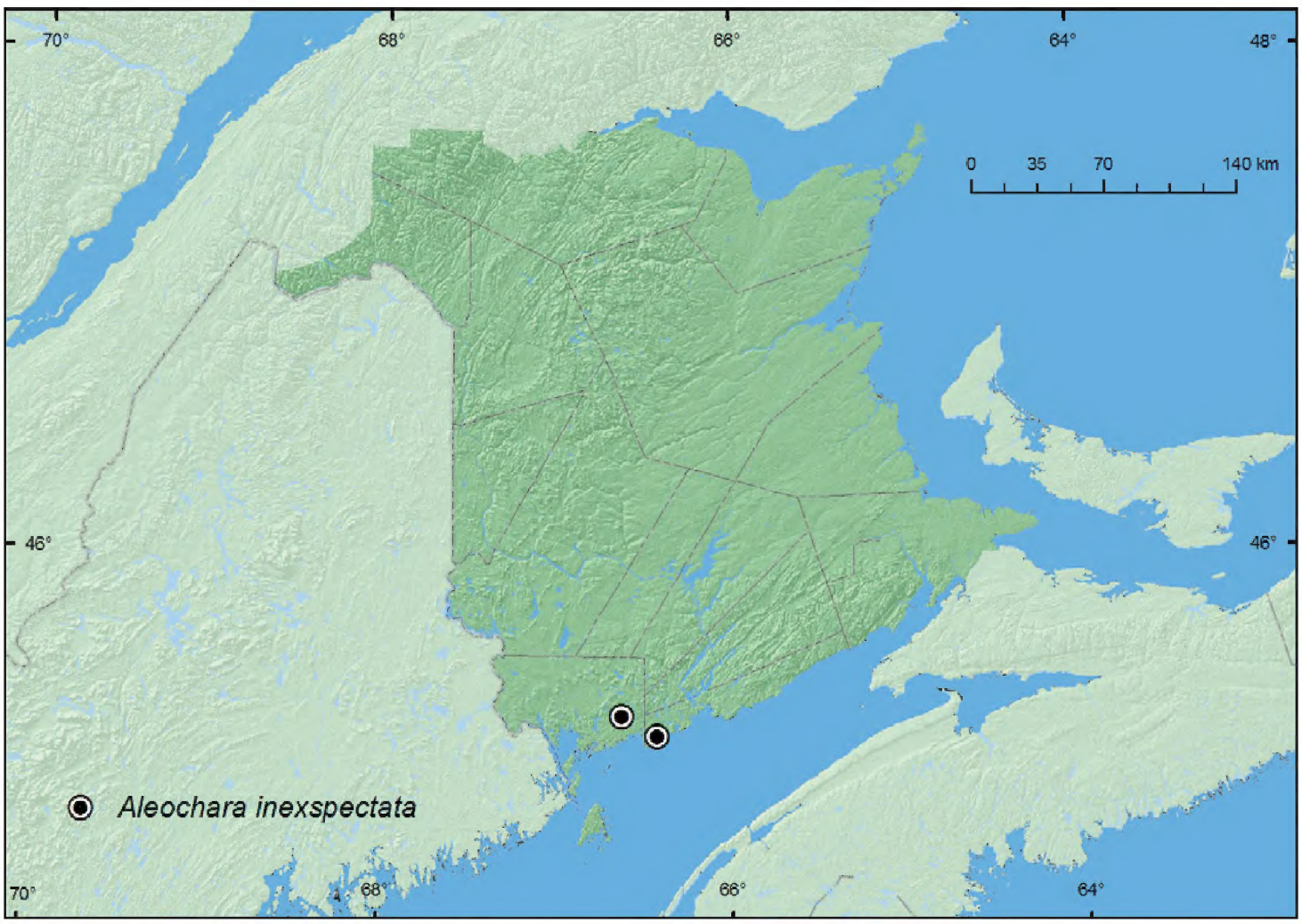
Aleochara (*Xenochara*) *inexspectata* Klimaszewski, 1984

Fig 5, Map 5

New Records. CANADA, New Brunswick, Charlotte Co., near New River, 45.2122°N, 66.6160°W, 2.VI.2006 (2 ♂, RWC). **Saint John Co.**, Dipper Harbour, 45.1169°N, 66.3771°W, 15.V.2006 (1 ♂, RWC).

Bionomic Notes. *Aleochara inexspectata* was collected from fresh moose dung in an eastern white cedar swamp and in decaying sea wrack resting on vegetation on the upper margin of a salt marsh in New Brunswick. Adults were collected during May and June. Little was previously known about the bionomics of this rare species. Collection method: sifting.

Distribution in Canada and Alaska. ON, QC, **NB**, NS (Klimaszewski 1984; Klimaszewski and Cervenka 1986; Gouix and Klimaszewski 2007).



Map 5. Collection localities in New Brunswick, Canada of *Aleochara inexspectata*.

***Aleochara* (*Xenochara*) *lanuginosa* Gravenhorst, 1802**
Fig 6, Map 6

New Records. New Brunswick, Northumberland Co., Burnt Church near Burnt Church River, 47.2075°N, 65.1471°W, 7.VIII.2005 (3 ♂, 2 sex undetermined, NBM, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 14.V.2005 (1 ♀, RWC).

Bionomic Notes. This species was collected from cow dung, and compost (decaying vegetables). Adults were collected in May and August. Collection method: sifting.

Distribution in Canada and Alaska. BC, AB, ON, QC, **NB**, NF (Klimaszewski 1984; Gouix and Klimaszewski 2007).

Tribe Hoplandriini Fenyes, 1920
***Hoplandria* (*s. str.*) *lateralis* (Melsheimer, 1844)**
Fig 7, Map 7

New Records. CANADA, New Brunswick, Queens Co., Grand Lake near Youngs Cove, 45.9636°N, 65.9979°W, 4.VIII.2005 (1 ♂, RWC).

Bionomic Notes. This species was collected from under a cobblestone along a lake margin with a cobblestone beach. Collection method: hand collecting (turning over cobblestones).

Map 6. Collection localities in New Brunswick, Canada of *Aleochara lanuginosa*.

Map 7. Collection localities in New Brunswick, Canada of *Hoplandria lateralis*.

Distribution in Canada and Alaska. ON, QC, **NB** (Génier 1989; Hanley 2003; Gouix and Klimaszewski 2007).

Tribe Oxypodini Thomson, 1859

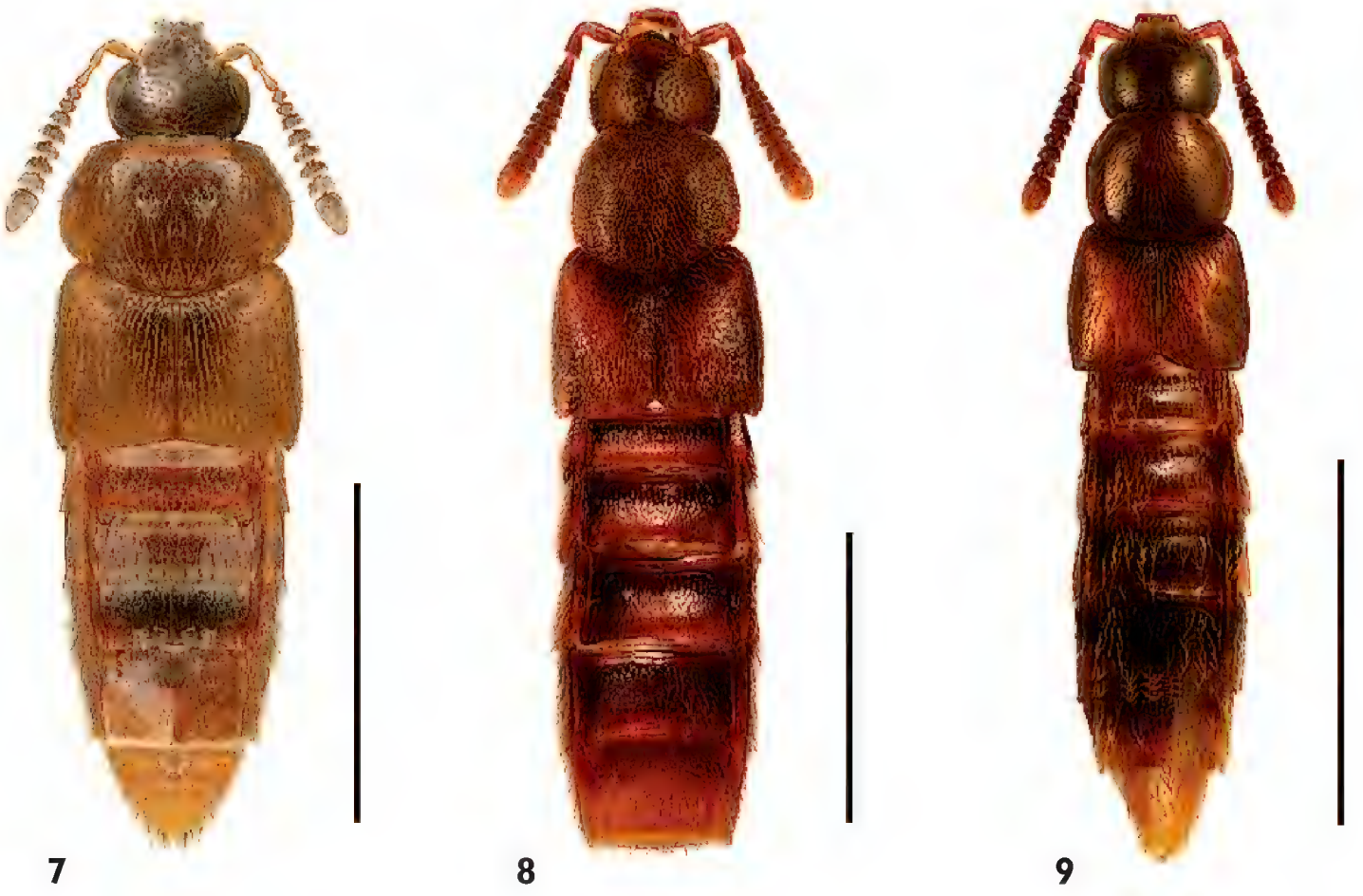
Amarochara formicina Assing, 2007

Figs 8, 58–60, Map 8

Additional Records. CANADA, New Brunswick, York Co., Charters Settlement, 45.8446°N, 66.7262°W, 4.VI.2005 (2 ♂, 1 ♀, RWC); Charters Settlement, 45.8286°N, 66.7365°W, 23.V.2005, 3.V.2006, 15.IX.2006 (2 ♂, 4 sex undetermined, RWC); 14 km W of Tracy off Rt. 645, 45.6862°N, 66.8651°W, 9.V.2007 (1 ♂, NBM).

Bionomic Notes. Adults were collected from the nests of a black *Formica* species of mound building ant. Some adults were collected by sifting soil from the top layer of the nest, including the holotype and paratypes (Assing 2007). However, the most efficient method for collecting adults of this species was to place small boards on the ant nests and examine the underside of the boards on subsequent days. Adults would be found resting on the underside of the boards. Adults were collected during April, May and September. This species probably overwinters in the adult stage. Collection method: sifting top layer of a nest, examining underside of boards placed on a nest.

Map 8. Collection localities in New Brunswick, Canada of *Amarochara formicina*.



Figures 7–12. 7 *Hoplandria lateralis* **8** *Amarochara formicina* **9** *A. inquilina* **10** *Calodera parviceps* **11** *Crataraea suturalis* **12** *Devia prospera* [8, 11, apical part of abdomen removed]. Scale = 1 mm

Distribution in Canada and Alaska. NB (Assing 2007). Additional specimens were collected from ants at other sites near the type locality and near Tracy, New Brunswick. This species may be more widespread than the records indicate.

Comments. The female of *A. formicina* was unknown at the time of the description (Assing 2007) and the female spermatheca, tergite and sternite 8 are illustrated for the first time in Figures 58–60. Externally the female is identical to the male. The spermatheca of *A. formicina* is similar in shape to that of *A. inquilina*, but is significantly larger.

Amarochara inquilina (Casey, 1906)

Fig 9, Map 9

Additional Records. CANADA, New Brunswick, Sunbury Co., Portobello Creek NWA, 45.9031°N, 66.4268°W, 11.IX.2006 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 27.IV.2006, 19.V.2006 (3 ♀, RWC); Charters Settlement, 45.8286°N, 66.7395°W, 3.V.2006 (1 ♂, RWC).

Bionomic Notes. Adults were collected from the nests of a black *Formica* species of mound building ant. Some adults were collected by sifting soil from the top layer of the nest, including those reported in Assing (2007). However, the most efficient method for collecting adults was to place small boards on the ant nests and examine the un-

Map 9. Collection localities in New Brunswick, Canada of *Amarochara inquilina*.

derside of the boards on subsequent days. Adults of this species or *A. formicina* would often be found resting on the underside of the boards. Interestingly, *A. inquilina* was rarely found in *Formica* nests together with *A. formicina*. Adults were collected during April, May and September. This species probably overwinters in the adult stage. Collection method: sifting top layer of a nest, examining underside of boards placed on a nest.

Distribution in Canada and Alaska. NB (Assing 2007).

***Calodera parviceps* (Casey, 1894)**
Fig 10, Map 10

Additional Records. CANADA, New Brunswick, Carleton Co., near Hovey Hill PNA, 46.1152°N, 67.7632°W, 10.V.2005 (6 ♀, LFC, RWC). **Restigouche Co.**, Little Tobique River near Red Brook, 47.4462°N, 67.0689°W, 24.V.2007 (2 ♂, 1 ♀, RWC). **Sunbury Co.**, Portobello Creek NWA, 45.8992°N, 66.4248°W, 27.V.2004 (2 ♂, LFC); Acadia Research Forest, 46.0173°N, 66.3741°W, 14.V.2007, 18.IX.2007 (1 ♂, 2 ♀, AFC, LFC, RWC); same locality data, 14.VI.2007 (1 ♀, LFC). **York Co.**, Charters Settlement, 45.8428°N, 66.7279°W, 20.IV.2006 (1 ♂, 2 ♀, LFC, RWC); 8.5 km W of Tracy off Rt. 645, 45.6821°N, 66.7894°W, 6.V.2008 (1 ♂, 1 ♀, RWC); Rt. 645 at Beaver Brook, 45.6860°N, 66.8668°W, 3.V.2008, 6.V.2008 (3 ♀, RWC); 9.2 km W of Tracy off Rt. 645, 45.6837°N, 66.8809°W, 22.V.2008 (1 ♀, RWC).

Map 10. Collection localities in New Brunswick, Canada of *Calodera parviceps*.

Bionomic Notes. *Calodera parviceps* was most frequently collected from leaf litter and moss under alders that were associated with vernal ponds, brooks and small streams, and areas with sedges (*Carex* sp.). These habitats occurred in mixed forests, old-growth eastern white cedar swamps, silver maple (*Acer saccharinum* L.) swamps, and alder swamps. Assing (2008) suggested that this species was likely an inhabitant of the litter layer of moist habitats, as are its closely related congeners. Adults were collected during April, May, June, and September. Collection method: sifting.

Distribution in Canada and Alaska. NS, NB, ON (Assing 2008). Assing (2008) reported *C. parviceps* for the first time from Canada from Nova Scotia, New Brunswick, and Ontario. The above records indicate that *C. parviceps* is probably widely distributed in New Brunswick in and near forested wetlands.

***Crataraea suturalis* (Mannerheim, 1830)**
Fig 11, Map 11

New Records. CANADA, New Brunswick, Queens Co., McAlpines, off Upper Hampstead Rd., 45.7250°N, 66.1200°W, 2.VI.2007, S. Makepeace and R.P. Webster (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 16.V.2006, M.-A. Giguère (1 ♀, RWC).

Map 11. Collection localities in New Brunswick, Canada of *Crataraea suturalis*.

Bionomic Notes. One adult of this adventive species was collected from the nest contents of a barred owl, *Strix varia* Barton, in June. Collection method: sifting.

Distribution in Canada and Alaska. BC, SK, **NB**, NS (Klimaszewski et al. 2007a; Gouix and Klimaszewski 2007).

***Devia prospera* (Erichson, 1839)**
Fig 12, Map 12

New Records. CANADA, New Brunswick, Queens Co., West of Jemseg near "Trout Creek", 45.8240°N, 66.1220°W, 26.IV.2004, 9.V.2004, 4.VI.2004 (4 ♂, 2 ♀, 6 sex undetermined, NBM, RWC). **York Co.**, Charters Settlement, 45.8341°N, 66.7445°W, 22.IV.2005, 5.V.2008 (1 ♂, 2 sex undetermined, RWC); W of Canterbury near "Browns Mt. Fen", 45.9033°N, 67.6260°W, 2.V.2005, M.-A. Giguère and R.P. Webster (1 ♂, RWC); Upper Brockway, 45.5703°N, 67.0990°W, 23.IV.2006 (1 ♂, NBM).

Bionomic Notes. Most adults of this species were found in leaf litter on the margins of vernal ponds in silver maple swamps, and mixed forests. In Labrador, this species was collected from willow humus and moss under willows (*Salix* species) (Gusarov 2003). Adults were collected in April, May, and June. Collection method: sifting.

Map 12. Collection localities in New Brunswick, Canada of *Devia prospera*.

Distribution in Canada and Alaska. AK, YT, NT, BC, AB, MB, ON, **NB**, NF & LB (Gusarov 2003, Klimaszewski et al. 2006; Gouix and Klimaszewski 2007; Klimaszewski et al. 2008a)

Gennadota canadensis Casey, 1906

Fig 13, Map 13

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1980°N, 67.6859°W, 31.V.2005, M.-A. Giguère and R.P. Webster (1 sex undetermined, CNC); Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 9.X.2006 (2 ♀, NBM, RWC). **Saint John Co.**, *ca.* 2.0 km NE of Maces Bay, 45.1168°N, 66.4552°W, 8.V.2006 (1 ♀, RWC). **York Co.**, "Browns Mountain Fen", 45.8951°N, 67.6333°W, 2.V.2006, M.-A. Giguère and R.P. Webster (1 ♂, 1 ♀, NBM, CNC); W of Canterbury near "Browns Mt. Fen", 45.9033°N, 67.6260°W, 2.V.2005, M.-A. Giguère and R.P. Webster (1 ♀, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 16.IV.2004, 18.IV.2004, 16.IX.2004 (teneral adult), 16.IV.2005, 22.IV.2006, 27.IV.2008 (4 ♂, 11 sex undetermined, CNC, LFC, NBM, RWC); same locality data, 29.III.2006 (partial snow cover present), (4 sex undetermined, NBM).

Map 13. Collection localities in New Brunswick, Canada of *Gennadota canadensis*.

Bionomic Notes. Most individuals of *G. canadensis* were collected from among decaying vegetables (compost) either within or adjacent to a commercially available plastic compost bin near a mixed forest in a small residential area. Others were collected from moist leaves under sap flows from recently cut or wounded trees, decaying mushrooms and moose dung in mixed forests. In Nova Scotia, *G. canadensis* was collected on dead pigs, a decaying gilled fungus, on decaying *Ganoderma* shelf-fungus, and in a pitfall trap among broken rocks and leaf litter at the entrance of a cave (Majka et al. 2006b). Prior to Majka et al. (2006b) records, only three specimens of this species were known, two from caves (Klimaszewski and Peck 1986; Klimaszewski and Pelletier 2004). Our data suggest that *G. canadensis* is a forest species associated with decaying organic matter and may only occur in caves incidentally. Collection method: sifting.

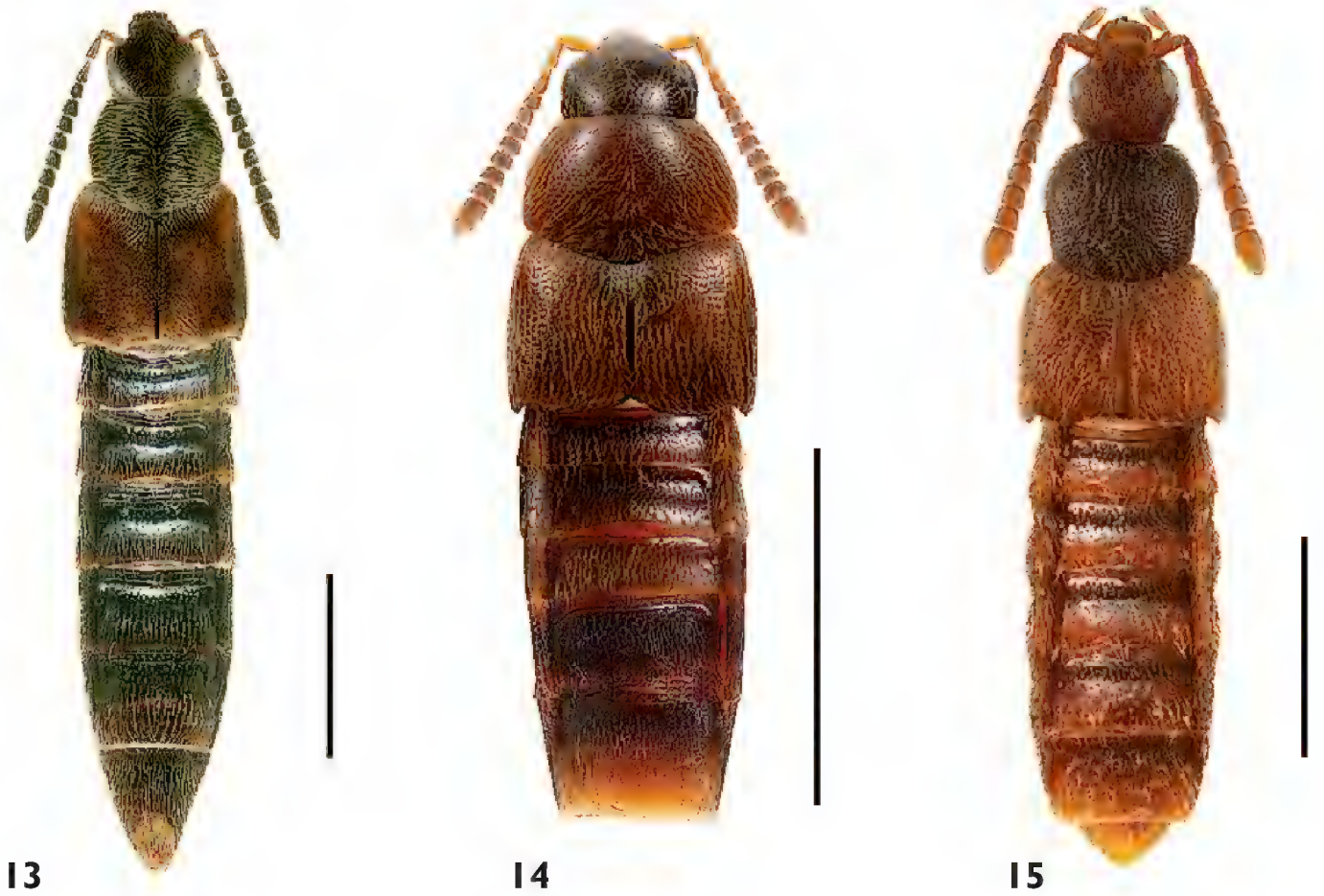
Adults were collected in late March, April, May, September and October. One adult collected in October was teneral. Four adults were captured in a flight intercept trap adjacent to a plastic composting bin on a warm day (12°C) in late March when a partial snow cover was still present. *Gennadota canadensis* probably overwinters in the adult stage and appears to become active very early in the spring.

Distribution in Canada and Alaska. NS, **NB**, ON, QC (Majka et al. 2006b; Gouix and Klimaszewski 2007).

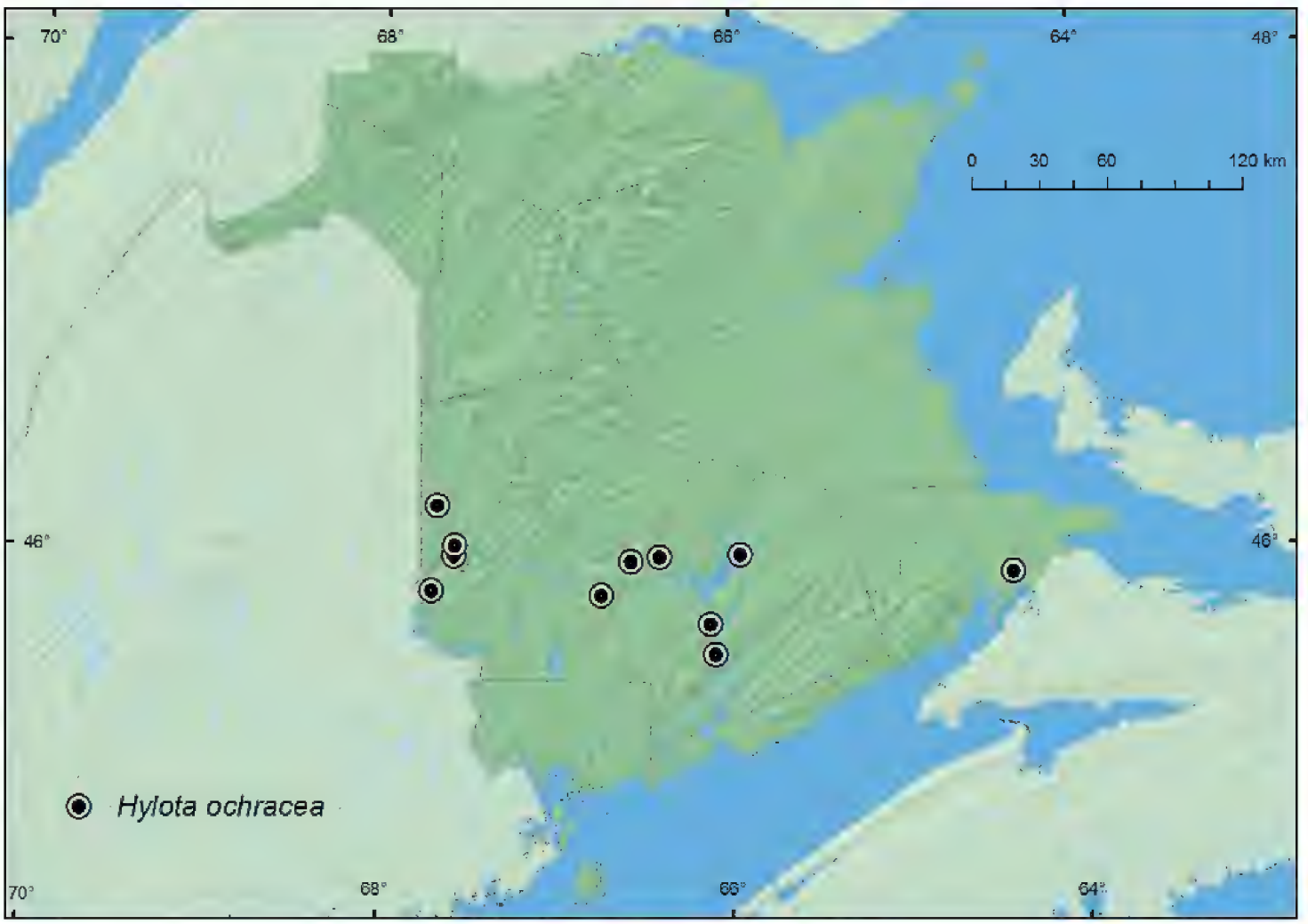
***Hylota ochracea* Casey, 1906**
Fig 14, Map 14

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1931°N, 67.6825°W, 31.V.2005, M.-A. Giguère and R.P. Webster (1 ♀, RWC); Benton, 45.9961°N, 67.5864°W, 24.V.2007, S. Makepeace and R.P. Webster (1 ♂, 1 sex undetermined, NBM); Hay Settlement, 46.0379°N, 67.5797°W, 24.V.2007, S. Makepeace and R.P. Webster (1 sex undetermined, NBM). **Queens Co.**, McAlpines near Upper Hampstead Rd., 45.7250°N, 66.1200°W, 26.VI.2008, S. Makepeace and R.P. Webster (1 sex undetermined, NBM); Quarries, 45.6043°N, 66.0914°W, 23.V.2007, S. Makepeace and R.P. Webster (1 sex undetermined, NBM); Rees, near Grand Lake, 46.0016°N, 65.9466°W, 29.V.2007, S. Makepeace and R.P. Webster (2 ♂, NBM). **Sunbury Co.**, Noonan, 45.9923°N, 66.4099°W, 2.VI.2007, S. Makepeace and R.P. Webster (1 sex undetermined, NBMB). **Westmorland Co.**, Sackville, near Ogden Mill, 45.9216°N, 64.3893°W, 12.V.2006, S. Makepeace (1 ♀, NBM). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 21.VI.2004, 20.IX.2005, 28.IX.2005, 5.IX.2006 (5 ♂, 2 ♀, 8 sex undetermined, LFC, RWC); Graham Corner, 45.8565°N, 67.7083°W, 26.VI.2007, S. Makepeace and R.P. Webster (1 sex undetermined, NBM); Marysville, 45.9750°N, 66.5700°W, 22.VI.2007, S. Makepeace and R.P. Webster (1 sex undetermined, NBM).

Bionomic Notes. *Hylota ochracea* was a common inhabitant of barred owl nests. Barred owl nests in tree holes (usually in large trees) and in artificial nest boxes. Adults



Figures 13–18. 13 *Gennadota canadensis* **14** *Hylota ochracea* **15** *Ilyobates bennetti* **16** *Ocyusa asperula* **17** *Oxypoda demissa* **18** *O. gnara* [14, 17, 18, apical part of abdomen removed]. Scale = 1 mm



Map 14. Collection localities in New Brunswick, Canada of *Hylota ochracea*.

of *H. ochracea* occurred in the nest contents which usually consisted of rich decaying organic material with bones, fur, owl pellets, portions of dead prey items (mice, squirrels, small birds), and often the contents had a strong urine smell. This species was also found in the nest contents of the great horned owl. Majka et al. (2006a) reported this species from the nests of the boreal owl, *Aegolius funereus richardsoni* (Bonaparte) and northern saw-whet owl, *Aegolius acadicus* (Gmelin) in Nova Scotia. Interestingly, *H. ochracea* was also common among decaying vegetables inside a plastic compost bin, which in some respects mimics the conditions found within a tree hole occupied by an owl. Only one adult of *H. ochracea* has been captured in New Brunswick in a habitat other than a tree hole or other enclosed situation; in drift material along a river margin. Adults were collected in May, June, and September. Collection method: sifting.

Distribution in Canada and Alaska. NT, ON, QC, **NB**, NS (Majka et al. 2006a; Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

Ilyobates bennetti Donisthorpe, 1914

Fig 15, Map 15

New Records. CANADA, New Brunswick, Sunbury Co., Lakeville Corner, 45.9008°N, 66.2414°W, 12.VII.2006, R.P. Webster (1 ♀, RWC); **York Co.**, Fredericton, at Saint John River, 45.9588°N, 66.6254°W, 7.VI.2005, R.P. Webster (1

Map 15. Collection localities in New Brunswick, Canada of *Ilyobates bennetti*.

♂, 2 sex undetermined, LFC, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 29.VIII.2007, R.P. Webster (1 sex undetermined, RWC).

Bionomic Notes. This adventive species was collected in litter at the base of a tree in a silver maple swamp, in flood debris along a river margin, and among decaying corncobs and cornhusks near a home in a forested residential area. Majka and Klimaszewski (2008d) reported this species from pitfall traps in pastures and a blueberry field in Nova Scotia. In Europe this species has been reported from similar habitats (Assing 1999). Adults were collected in June, July, and August. Collection method: sifting.

Distribution in Canada and Alaska. QC, **NB**, NS (Assing 1999; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008d).

Ocyusa asperula Casey, 1894

Fig 16, Map 16

New Records. CANADA, New Brunswick, Charlotte Co., 3 km SW of King Brook Lake, 45.3194°N, 67.4414°W, 27.V.2007 (1 sex undetermined, RWC); 3.0 km NW of Pomeroy Ridge, 45.3059°N, 67.4343°W, 5.VI.2008 (1 sex undetermined, RWC). **Northumberland Co.** Goodfellow Brook PNA, 46.8943°N, 65.3796°W, 23.V.2007 (1 sex undetermined, NBM). **York Co.** New Maryland, off Hwy 2, E of Baker

Map 16. Collection localities in New Brunswick, Canada of *Ocyusa asperula*.

Brook, 45.8760°N, 66.6252°W, 6.IV.2005 (1 ♂, RWC); near Mazerolle Settlement, 45.8987°N, 66.7903°W, 9.IV.2006, (6 ♂, 3 ♀, LFC, RWC, NBM); 9.2 km W of Tracy off Rt. 645, 45.6837°N, 66.8809°W, 22.V.2008 (1 ♀, RWC).

Bionomic Notes. Most adults of *O. asperula* were found in grass litter and mosses (usually sphagnum) near small pools in eastern white cedar swamps, red maple (*Acer rubrum* L.) swamps with eastern white cedar, and in alder swamps. Adults were collected in April, May and June. Collection method: sifting.

Distribution in Canada and Alaska. NB (first Canadian record) (This species was described from Rhode Island by Casey, 1894 [often cited as 1893]).

Oxypoda demissa Casey, 1911

Fig 17, Map 17

New Records. CANADA, New Brunswick, Carleton Co., near "Two Mile Brook Fen", 46.3510°N, 67.6815°W, 6.V.2005, M.-A. Giguère and R.P. Webster (1 ♂, RWC); near Hovey Hill Protected Area, 46.1152°N, 67.7632°W, 10.V.2005 (1 ♀, RWC). **Restigouche Co.**, Jacquet River Gorge PNA, 47.7357°N, 67.0774°W, 24.VI.2008 (1 ♀, RWC). **York Co.** Charters Settlement, 45.8428°N, 66.7279°W, 20.IV.2005 (1 ♂, 1 ♀, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 23.IV.2008 (2 ♂, 2 ♀,

Map 17. Collection localities in New Brunswick, Canada of *Oxypoda demissa*.

RWC); 8.0 km NW of Magundy, 45.8712°N, 67.2221°W, 8.VII.2006 (1 ♀, RWC); 8.4 km W of Tracy off Rt. 645, 45.6821°N, 66.7894°W, 14.V.2008 (1 ♀, RWC).

Bionomic Notes. *Oxypoda demissa* appears to be a hygrophilous species associated with wet habitats of various kinds. In New Brunswick, adults were captured in moist leaf litter on the margin of a vernal pond in a mixed forest, among leaves and sedges on pond margin, in moist grass litter and sphagnum in *Carex* marsh, among sedges along margin of small spring-fed brook in a mature hardwood forest and among leaf litter and grass on hummocks in a wet alder (*Alnus* sp.) swamp. In Nova Scotia, this species was reported from litter of *Alnus* clumps (Klimaszewski et al. 2006). A number of adults were collected with a net during late afternoon (15:00 to 18:00 h) flights. Adults were captured in April, May, June, and July. Collection method: sifting, some collected in flight with net during evening.

Distribution in Canada and Alaska. YT, ON, QC, **NB**, NS, NF & LB (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007; Klimaszewski et al. 2008b).

Oxypoda gnara Casey, 1911

Fig 18, Map 18

New Records. CANADA, New Brunswick, York Co., Slagundy Dry Ponds, 45.8596°N, 67.1849°W, 8.VII.2006 (5 ♂, 5 ♀, 2 sex undetermined, RWC).

Map 18. Collection localities in New Brunswick, Canada of *Oxypoda gnara*.

Bionomic Notes. *Oxypoda gnara* was collected from moist leaves along the margin of a large (35 m x 15 m) vernal pond in a mixed forest. This pond usually dries up completely by mid-July during most years, but was full when the adults were collected in July 2006 due to heavy rains. Nothing was previously known about the bionomics of this species. Collection method: sifting.

Distribution in Canada and Alaska. ON, QC, **NB** (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

Oxypoda lacustris Casey, 1906

Fig 19, Map 19

New Records. CANADA, New Brunswick, Albert Co., Shepody NWA, Germantown Section, 45.7056°N, 64.7642°W, 17.V.2004 (1 ♂, RWC). **Queens Co.**, W. of Jemseg at "Trout Creek", 45.8227°N, 66.1240°W, 26.IV.2004, 9.V.2004 (2 ♂, 1 sex undetermined, RWC); Grand Lake, near Scotchtown, 45.8762°N, 66.1816°W, 3.VI.2007 (1 ♀, RWC). **Sunbury Co.,** Portobello Creek NWA, 45.8952°N, 66.2728°W, 7.V.2004 (1 ♀, RWC); Acadia Research Forest, 46.017°N, 66.374°W, 15.VI.2004, J. Sweeney, coll., Site 16, strip 1, Pitfall Trap #3 (1 ♂, AFC). **York Co.**, Charters Settlement, 45.8341°N, 66.7445°W, 22.IV.2005, 29.III.2006, 21.IV.2006, 31.V.2006, 5.V.2008, 31.V.2006 (2 ♂, 1 ♀, 3 sex undetermined, RWC); Slagundy Dry Ponds, 45.8596°N, 67.1849°W, 8.VII.2006 (1 ♂, RWC); Rt. 645 at Beaver

Map 19. Collection localities in New Brunswick, Canada of *Oxypoda lacustris*.

Brook, 45.6860°N, 66.8668°W, 6.V.2008, *Carex* marsh in leaf and grass litter at base of red maple (1 ♀, RWC).

Bionomic Notes. *Oxypoda lacustris* appears to be a hygrophilous species associated with wet habitats of various kinds. In New Brunswick, adults were captured in marsh litter in a cattail/sedge marsh, in leaf and grass litter at base of red maple in a *Carex* marsh, in leaf litter in silver maple swamps, in moist leaf litter on margins of vernal ponds in mixed forests, and in drift material on a lake margin. Adults were collected in late March, April, May, June, and July. Collection method: sifting.

Distribution in Canada and Alaska. AB, YT, NT, BC, AB, ON, QC, **NB**, NF & LB (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

Comments. *Oxypoda lacustris* reported by Klimaszewski et al. (2005) from New Brunswick was a misidentification for *O. pseudolacustris* Klimaszewski (Klimaszewski et al. 2006).

Oxypoda lucidula Casey, 1906

Fig 20, Map 20

New Records. CANADA, New Brunswick, Albert Co., Shepody NWA, Mary's Point Section, 45.7260°N, 64.6640°W, 12.IX.2004 (1 ♀, RWC). **Carleton Co.**, Meduxnekeag River Valley Nature Preserve, 46.1931°N, 67.6825°W, 31.V.2005, M.-

Map 20. Collection localities in New Brunswick, Canada of *Oxypoda lucidula.*

A. Giguère and R.P. Webster (1 ♂, RWC); "Bell Forest", 46.2145°N, 67.7206°W, 12.IV.2007 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, this species was collected from decaying gilled mushrooms and drift material on river margins. Elsewhere in Canada most adults were collected from litter near various wetlands (stream and pond margins) (Klimaszewski et al. 2006). Adults were collected in April, May, and September. Collection method: sifting.

Distribution in Canada and Alaska. AK, YT, NT, AB, MB, ON, QC, **NB** (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

***Oxypoda opaca* (Gravenhorst, 1802)**
Fig 21, Map 21

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 12.VIII.2004, 23.VI.2006 (2 sex undetermined, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 16.IV.2005, 27.IV.2005, 29.III.2006, 5.V.2006, 27.IV.2008 (1 ♂, 3 ♀, 1 sex undetermined, RWC); same locality, 18.X.2007 (1 sex undetermined, RWC); same locality, 23.IV.2008 (1 ♂, RWC).

Bionomic Notes. Most adults of this adventive species were collected from decaying organic material (decaying fleshy fungi, decaying vegetables (compost), decaying

Figures 19–24. 19 *Oxypoda lacustris* **20** *O. lucidula* **21** *O. opaca* **22** *O. vockerothi* **23** *Tachyusa americana* **24** *Myllaena ludificans*[19, 21, 22, 24, apical part of abdomen removed]. Scale = 1 mm

Map 21. Collection localities in New Brunswick, Canada of *Oxypoda opaca*.

moldy corncobs and cornhusks). One flying individual was collected with a net during the late afternoon (15:00 to 18:00 h) in late April. Adults were collected in late March, April, May, June, August, and October. Collection method: sifting, some collected in flight with net during evening.

Distribution in Canada and Alaska. ON, **NB**, NS (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

Oxypoda vockerothi Klimaszewski et al., 2006a

Fig 22, Map 22

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1964°N, 67.6340°W, 31.V.2005, M.-A. Giguère and R.P. Webster (1 ♂, RWC); near Hovey Hill Protected Area, 46.1152°N, 67.7632°W, 10.V.2005 (1 ♀, RWC). **York Co.**, W of Canterbury near "Browns Mountain Fen", 45.9033°N, 67.6260°W, 2.V.2005, 29.IV.2006, M.-A. Giguère and R.P. Webster (1 ♂, 2 ♀, RWC); Charters Settlement, 45.8340°N, 66.7450°W, 21.V.2006, 5.V.2008 (1 ♂, 2 ♀, RWC).

Bionomic Notes. *Oxypoda vockerothi* was collected in moist leaf litter along margins of vernal ponds in mixed forests, mixed forests with eastern white cedar, and in a hardwood forest. Nothing was previously known about the bionomics of this species. Adults were collected during April and May. Collection method: sifting.

Map 22. Collection localities in New Brunswick, Canada of *Oxypoda vockerothi*.

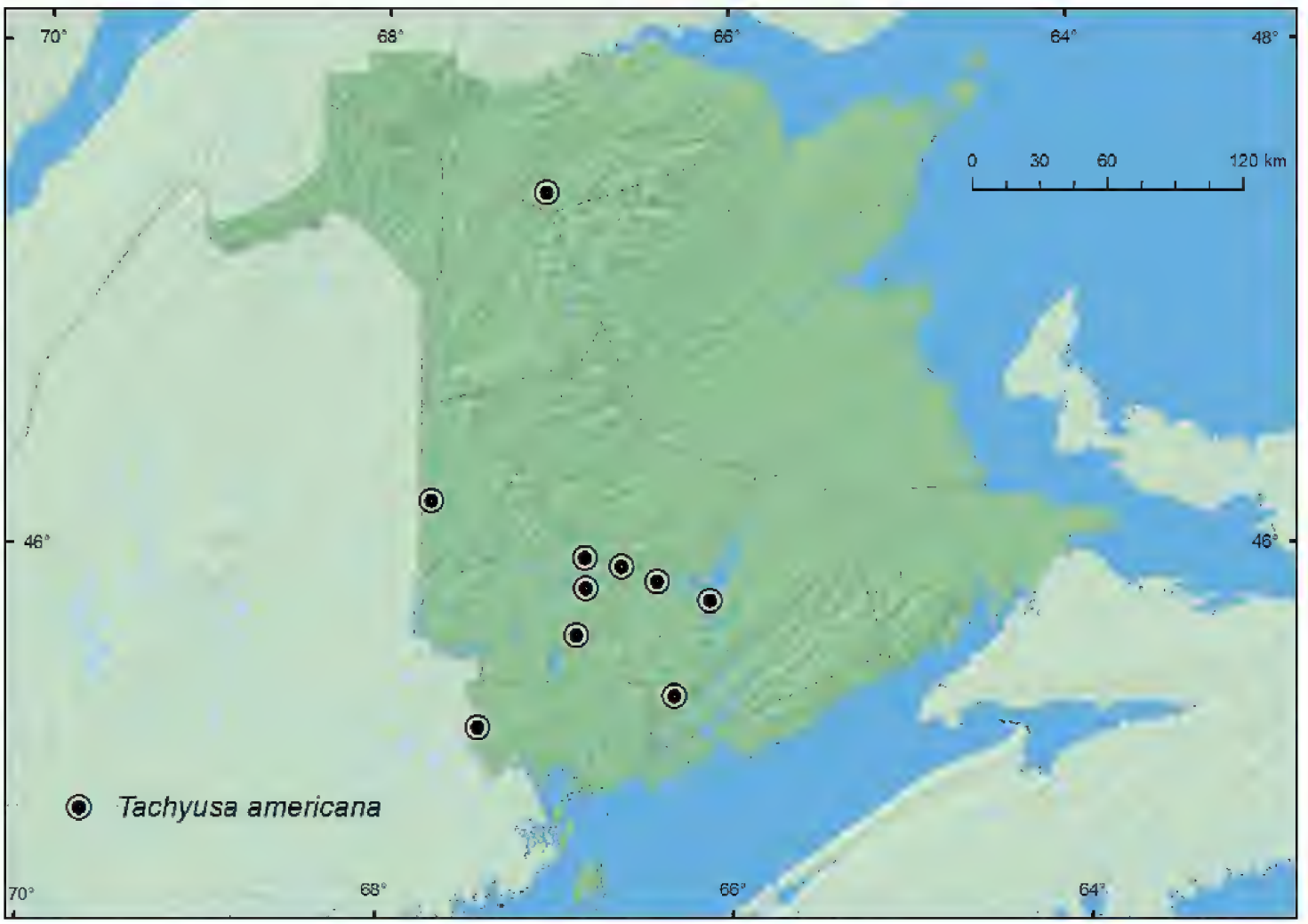
Distribution in Canada and Alaska. ON, **NB** (Klimaszewski et al. 2006; Gouix and Klimaszewski 2007).

Oxypoda vockerothi was previously known only from the type locality, Marmora, Ontario, Canada. The above records indicate that this species is more widely distributed in Canada.

Tachyusa americana Casey, 1906

Fig 23, Map 23

New Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2152°N, 67.7190°W, 12.VII.2004, K. Bredin, J. Edsall, and R.P. Webster (2 sex undetermined, NBM, RWC). **Charlotte Co.**, near Clark Ridge, 45.3155°N, 67.4406°W, 27.V.2007 (1 ♀, RWC). **Queens Co.**, W of Jemseg near "Trout Creek", 45.8227°N, 66.1240°W, 1.IX.2004 (1 sex undetermined, NBM); Bayard, at Nerepis River, 45.4426°N, 66.3280°W, 30.V.2008 (1 ♂, RWC). **Restigouche Co.**, Little Tobique River near Red Brook, 47.4465°N, 67.0689°W, 13.VI.2006 (1 ♀, RWC). **Sunbury Co.** Portobello Creek NWA, 45.8992°N, 66.4248°W, 24.VI.2004 (2 sex undetermined, NBM). **York Co.**, Mazerolle Settlement, 45.8729°N, 66.8311°W, 28.IV.2006 (1 ♂, 1 ♀, RWC); Fredericton, at Saint John River, 45.9588°N, 66.6254°W, 4.VII.2004 (1 sex undetermined, RWC); Keswick River at Rt. 105, 45.9938°N, 66.8344°W, 24.VI.2004, 3.VI.2008 (2 ♀, 1 sex undetermined, NBM, RWC); 9.2 km W of Tracy off Rt. 645, 45.6837°N, 66.8809°W, 22.V.2008 (1 ♂, RWC).



Map 23. Collection localities in New Brunswick, Canada of *Tachyusa americana*.

Bionomic Notes. Most adults of *T. americana* were collected from litter (leaf litter, silver maple seeds, grass litter), often on muddy soil along the margins of rivers and streams through flood plain forests, and margins of beaver ponds. Some adults were collected on mud with sparse vegetation along a sun-exposed stream margin through a former beaver pond. Adults were captured in April, May, June, July, and September. Collection method: sifting, hand collecting with aspirator.

Distribution in Canada and Alaska. ON, QC, **NB** (Pasnik 2006; Gouix and Klimaszewski 2007).

Tribe Myllaenini Ganglbauer, 1895
***Myllaena kaskaskia* Klimaszewski, 1982**
Figs 25, 61–63, Map 24

New Records. CANADA, New Brunswick, Charlotte Co. near New River, 45.2067°N, 66.6505°W, 13.VI.2008 (1 ♂, 3 ♀, LFC, RWC). **York Co.**, Charters Settlement, 45.8404°N, 66.7360°W, 27.V.2008 (7 ♂, 8 ♀, LFC, RWC).

Bionomic Notes. *Myllaena kaskaskia* was found among cobblestones and gravel along the margins of medium- to large-sized brooks partially shaded by alders. Adults were located by turning over cobblestones and larger pebbles along the brook margin or on small gravel bars. One specimen from Georgia (United States) was collected along a

Map 24. Collection localities in New Brunswick, Canada of *Myllaena kaskaskia*.

stream (Klimaszsewski 1982). No additional information was previously known about the bionomics of this species. In New Brunswick, adults were collected in May and June. Collection method: hand collecting (turning over cobblestones and pebbles).

Distribution in Canada and Alaska. NB (first Canadian record) (Klimaszewski 1982; Gouix and Klimaszewski 2007). This species was previously known from the eastern United States from Virginia, Georgia, and Illinois (Klimaszewski 1982). The record from New Brunswick represents a significant range extension for this species.

Myllaena ludificans Casey, 1911

Fig 24, Map 25

New Records. CANADA, New Brunswick, Charlotte Co. near New River, 45.2067°N, 66.6505°W, 13.VI.2008 (1 ♂, RWC). **York Co.**, Mazerolle Settlement, 45.8729°N, 66.8311°W, 28.IV.2006 (1 ♂, 1 ♀, RWC).

Bionomic Notes. In New Brunswick, adults of *M. ludificans* were collected from gravel on the margin of a large brook on a gravel bar partially shaded by alders, and in grass litter on muddy soil along a sun exposed stream margin through a former beaver pond. Elsewhere, this species was collected from margins of ponds (Klimaszewski 1982). In New Brunswick it was collected in April and June. Collection method: hand collecting (turning over cobblestones and pebbles), sifting.

Map 25. Collection localities in New Brunswick, Canada of *Myllaena ludificans*.

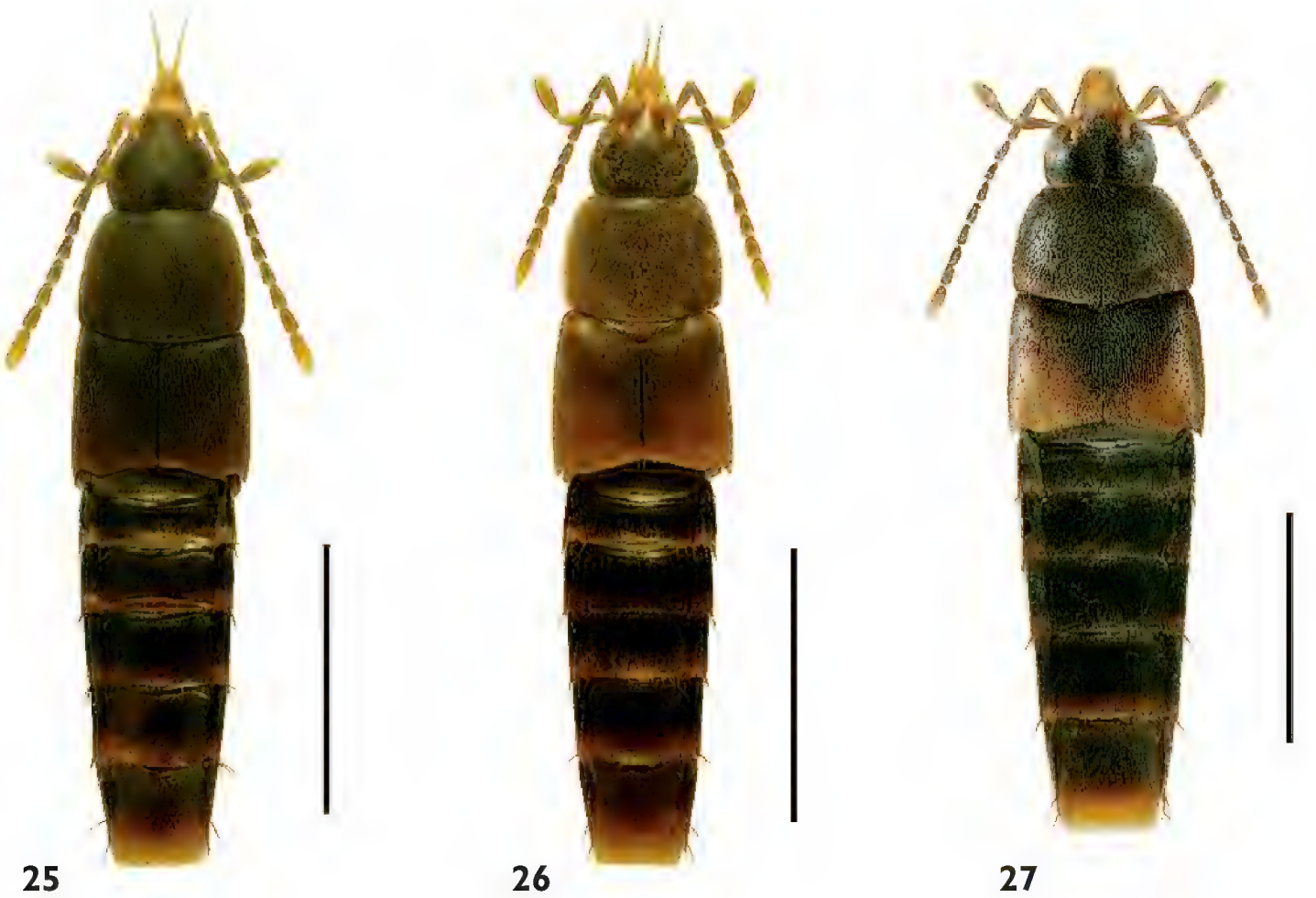
Distribution in Canada and Alaska. ON, QC, **NB** (Klimaszewski 1982, Gouix and Klimaszewski 2007). *Myllaena ludificans* occurs throughout eastern North America from Oklahoma north to Ontario, Quebec and Massachusetts (Klimaszewski 1982).

Myllaena procidua Casey, 1911

Figs 25, 64–66, Map 26

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1888°N, 67.6762°W, 25.VI.2007 (1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1942°N, 67.6832°W, 3.VII.2006, 9.VI.2008 (6 ♂, 4 ♀, 1 sex not determined, LFC, RWC). **Northumberland Co.**, Nelson Hollow at "Kelley Channel", 46.5433°N, 66.1842°W, 11.VIII.2006 (1 ♀, RWC); Amostown at Miramichi River, 46.5339°N, 66.2095°W, 11.VIII.2006 (1 ♂, RWC). **Queens Co.**, Bayard at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008, 30.V.2008 (3 ♂, 2 ♀, LFC, RWC). **Restigouche Co.**, Jacquet River Gorge PNA at Jacquet River, 47.8197°N, 66.0835°W, 23.VI.2008 (1 ♂, NBM). **York Co.**, 1.5 km N of Durham Bridge at Nashwaak River, 46.1408°N, 66.6179°W, 15.VI.2008 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, adults occurred along river (clear water) margins among cobblestones set in sand and fine gravel at water's edge, or among gravel at the edge of the water. Adults were located by turning over cobblestones and larger



Figures 25–30. 25 *Myllaena kaskaskia* **26** *M. procidua* **27** *M. vulpina* **28** *Euvira micmac* **29** *Leptusa carolinensis* **30** *Neotobia alberta* [25-27, apical part of abdomen removed]. Scale = 1 mm

Map 26. Collection localities in New Brunswick, Canada of *Myllaena procidua*.

pebbles. Little was previously known about the habitat association of this species. In New Brunswick, adults were collected during May, June, July, and August. Collection method: hand collecting (turning over cobblestones and pebbles).

Distribution in Canada and Alaska. QC, **NB** (Klimaszewski 1982; Gouix and Klimaszewski 2007).

Comments. The male of *M. procidua* was unknown at the time of its description (Klimaszewski 1982). A number of males of this species were captured and we illustrate for the first time the median lobe of the aedeagus in dorsal and lateral view (Figs. 64 and 65). The male median lobe of aedeagus of *M. procidua* is very similar to that of *M. kaskaskia* and *M. vulpina*. These are shown in Figs. 61 and 62 (*M. kaskaskia*) and Figs. 67 and 68 (*M. vulpina*) for comparison. However, the shape of the female spermatheca differs significantly and is a much better diagnostic character for separation of these three species (Figs. 63, 66, and 69).

Myllaena vulpina Bernhauer, 1907

Figs 27, 67–69, Map 27

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1944°N, 67.6832°W, 3.VII.2006, 2.VI.2008 (1 ♂, 2 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1942°N, 67.6832°W,

Map 27. Collection localities in New Brunswick, Canada of *Myllaena vulpina*.

9.VI.2008 (7 ♂, 6 ♀, 1 sex undetermined, LFC, RWC). **Northumberland Co.**, Amostown, at Miramichi River, 46.5339°N, 66.2095°W, 11.VIII.2006 (1 ♀, RWC). **York Co.**, 1.5 km N of Durham Bridge at Nashwaak River, 46.1408°N, 66.6179°W, 15.VI.2008 (1 ♀, RWC).

Bionomic Notes. Adults of *M. vulpina* were collected along river (clear water) margins among cobblestones or gravel at the edge of the water at all sites where this species was found. Adults were located by turning over cobblestones or larger pebbles. Nothing was previously known about the habitat association of this species. In New Brunswick, adults were collected during June and August. Collection method: hand collecting (turning over cobblestones and pebbles).

Distribution in Canada and Alaska. ON, **NB**, NS (Klimaszewski 1982; Gouix and Klimaszewski 2007).

Tribe Homalotini Heer, 1839

***Euvira micmac* Klimaszewski & Majka, 2007**

Fig 28, Map 28

New Records. CANADA, New Brunswick, York Co. Charters Settlement, 45.8430°N, 66.7275°W, 11.VII.2005 (1 ♂, RWC); Charters Settlement, 45.8342°N, 66.7450°W, 21.IV.2006 (1 ♀, RWC).

Map 28. Collection localities in New Brunswick, Canada of *Euvira micmac*.

Bionomic Notes. One adult was collected by beating foliage in a regenerating mixed forest (about 15 years old) with a few red oaks (*Quercus rubra* L.) in July and another was collected in April from moist leaf litter on the margin of a vernal pond in a mixed forest. In Nova Scotia, five individuals of *E. micmac* were found inside spherical galls on red oak. Other individuals were collected in areas with red oak. However, it is unclear if this species is an obligate resident of oak galls. Collection method: beating foliage, sifting.

Distribution in Canada and Alaska. NS, **NB** (Klimaszewski and Majka 2007; Gouix and Klimaszewski 2007).

Leptusa (*Dysleptusa*) *carolinensis* Pace, 1989

Fig 29, Map 29

New Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2200°N, 67.7231°W, 6.V.2006 (2 ♂, 5 ♀, RWC); same locality and date (1 ♂, RWC). **Queens Co.**, near Queenstown, 45.6904°N, 66.1455°W, 13.V.2008 (1 ♀, RWC). **Saint John Co.**, Musquash, 45.1837°N, 66.3376°W, 7.V.2006 (1 ♂, RWC).

Bionomic Notes. In New Brunswick, *L. carolinensis* was found in hardwood forests under bark of American beech (*Fagus grandifolia* Ehrh.) logs, under bark of sugar maple (*Acer saccharum* Marsh.), and in fleshy polypore (bracket) fungi on dead stand-

Map 29. Collection localities in New Brunswick, Canada of *Leptusa carolinensis*.

ing beech tree. One individual was collected from marsh litter on the inland margin of a salt marsh. This data suggests that *L. carolinensis* is associated with subcortical microhabitats and other microhabitats associated with trees. Elsewhere, this species was captured in Lindgren funnel traps, pitfall traps, and flight intercept traps in sugar maple, red spruce (*Picea rubens* Sarg.), black spruce forests and red spruce/eastern hemlock (*Tsuga canadensis* (L.) Carr.) forests of various ages (Klimaszewski et al. 2004). In New Brunswick, all adults were captured in May. Collection method: hand searching subcortical habitats, sifting.

Distribution in Canada and Alaska. QC, **NB**, NS (Pace 1989; Klimaszewski et al. 2004; Gouix and Klimaszewski 2007).

Neotobia alberta Ashe, 1992

Fig 30, Map 30

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 3.VII.2006 (1 sex undetermined, RWC); Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 8.VIII.2006 (1 ♂, RWC); same locality data, 13.VIII.2006 (2 ♀, RWC). **Sunbury Co.**, Acadia Research Forest, 46.0188°N, 66.3765°W, 17.VIII.2007 (1 ♀, AFC). **York Co.**, Charters Settlement, 45.8340°N, 66.7450°W, 20.V.2007 (1 ♂, RWC).

Map 30. Collection localities in New Brunswick, Canada of *Neotobia alberta*.

Bionomic Notes. *Neotobia alberta* was collected from various fungi growing on dead standing trees and logs in mixed forests. Adults were found in slightly dried *Pleurotus* mushrooms, polypore fungi in early stages of decay, and in decaying *Hapalopilus nidulans* (Fr.) Karst. (a fleshy polypore fungus). Adults were collected in May, July, and August. Collection method: sifting.

Distribution in Canada and Alaska. AB, MB, ON, QC, **NB** (Ashe 1992; Gouix and Klimaszewski 2007).

***Phymatura blanchardi* (Casey, 1894)**
Fig 31, Map 31

New Records. CANADA, New Brunswick, Queens Co., Grand Lake, near Scotchtown, 45.8762°N, 66.1816°W, 19.IX.2006 (4 ♂, 4 ♀, RWC). **Sunbury Co.**, Portobello Creek NWA, 45.8990°N, 66.4200°W, 28.VI.2004 (1 ♂, RWC).

Bionomic Notes. Adults were collected from inside a decayed log covered with gilled mushrooms and polypore fungi. One individual was collected from under loose bark. Some of the individuals collected in late September were teneral, suggesting that this species probably overwinters as an adult. Majka and Klimaszewski (2008b) mentioned that this species was associated with fungi. Adults

Map 31. Collection localities in New Brunswick, Canada of *Phymatura blanchardi*.

were collected in June and September. Collection method: sifting, hand searching subcortical habitat.

Distribution in Canada and Alaska. AB, **NB** (Casey 1894; Ashe 1992; Majka and Klimaszewski 2008b). *Phymatura blanchardi* was recorded for the first time for Canada from a single specimen collected in Alberta (Lac La Biche) in a modified window trap (Majka and Klimaszewski 2008b). The presence of this species in New Brunswick suggests a much wider distribution in Canada.

Silusa densa Fenyes, 1909

Fig 32, Map 32

New Records. CANADA, New Brunswick, York Co. Charters Settlement, 45.8188°N, 66.7460°W, 21.III.2005, 27.III.2005 (5 ♂, 2 ♀, 3 sex undetermined, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 30.V.2007 (1 ♂, RWC).

Bionomic Notes. Most adults of *S. densa* were found under bark of spruce logs infested with Scolytinae in late March when a deep snow pack was still present. *Silusa densa* co-occurred with *Leptusa jucunda* Klimaszewski and Majka and mating pairs of both species were observed when they were collected. It was sunny and the air temperature was near 5°C when the adults were collected, although the surface of the log was

Map 32. Collection localities in New Brunswick, Canada of *Silusa densa*.

considerably warmer. One adult was also collected under tight bark of a dead standing balsam fir (*Abies balsamea* (L.) Mill.) during late May. Collection method: hand searching subcortical habitat.

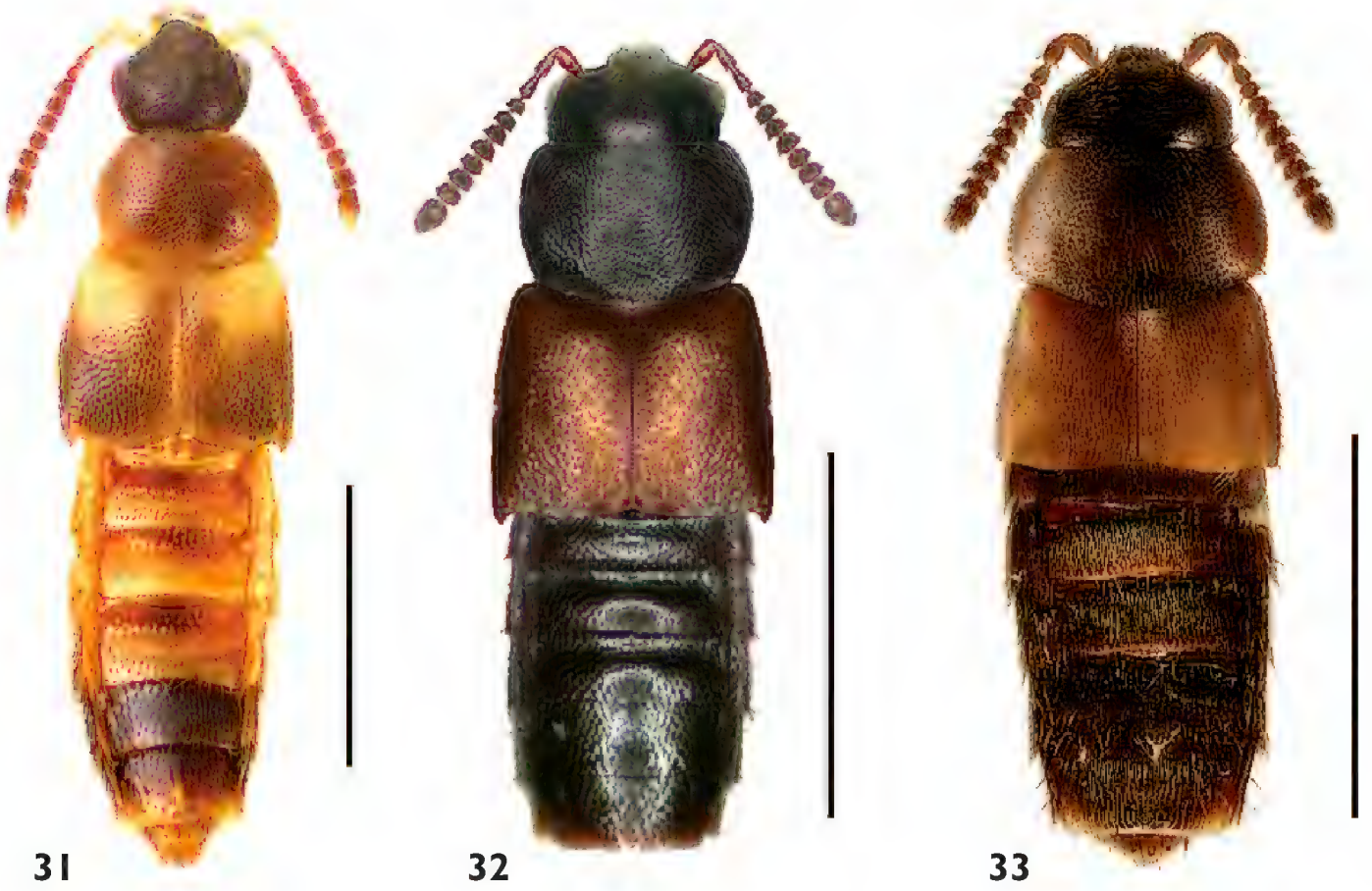
Distribution in Canada and Alaska. AB, **NB** (Klimaszewski et al. 2003; Gouix and Klimaszewski 2007). The presence of this species in New Brunswick suggests a much wider distribution in Canada.

Tribe Placusini Mulsant and Rey, 1871
***Placusa incompleta* Sjöberg, 1934**
Fig 33, Map 33

New Records. CANADA, New Brunswick, York Co. Charters Settlement, 45.8286°N, 66.7365°W, 3.VI.2008 (1 sex undetermined, 5 ♂, 4 ♀, RWC).

Bionomic Notes. Adults were found in mature red spruce and red maple forest, under bark of red spruce infested with *Dendroctonus rufipennis* (Kirby) and *Polygraphus rufipennis* (Kirby). Collection method: hand searching subcortical habitat.

Distribution in Canada and Alaska. This is a Holarctic or adventive Palaearctic species recorded in Canada from BC, QC, **NB**, NS (Klimaszewski et al. 2001; Gouix and Klimaszewski 2007).



Figures 31–36. 31 *Phymatura blanchardi* **32** *Silusa densa* **33** *Placusa incompleta* **34** *P. tacomae* **35** *P. vaga* **36** *Aloconota sulcifrons* [32, 36, apical part of abdomen removed]. Scale = 1 mm

Map 33. Collection localities in New Brunswick, Canada of *Placusa incompleta*.

***Placusa tacomae* Casey, 1894**
Fig 34, Map 34

New Records. CANADA, New Brunswick, York Co. Charters Settlement, 45.8286°N, 66.7365°W, 3.VI.2008, mature red spruce and red maple forest, under bark of red spruce infested with *D. rufipennis* (Kirby) and *P. rufipennis* (1 sex undetermined, 2 ♂, 4 ♀, RWC).

Bionomic Notes. Adults were found in mature red spruce and red maple forest, under bark of red spruce infested with *D. rufipennis* and *P. rufipennis*. Collection method: hand searching subcortical habitat.

Distribution in Canada and Alaska. YT, NT, BC, AB, ON, QC, **NB**, NS (Klimaszewski et al. 2001; Gouix and Klimaszewski 2007).

***Placusa vaga* Casey, 1911**
Fig 35, Map 35

New Records. CANADA, New Brunswick, Carleton Co. near the Hovey Hill Protected Area, 46.1155°N, 67.7631°W, 10.V.2005 (2 sex undetermined, 1 ♂, 1 ♀,

Map 34. Collection localities in New Brunswick, Canada of *Placusa tacomae*.

Map 35. Collection localities in New Brunswick, Canada of *Placusa vaga*.

RWC); "Bell Forest", 46.2152°N, 67.7190°W, 11.V.2005, M.-A. Giguère and R.P. Webster (1 ♂, RWC). **Sunbury Co.**, 7.5 km W of Tracy off Rt. 645, 45.6861°N, 66.7719°W, 9.V.2007 (1 ♀, RWC).

Bionomic Notes. Adults of *P. vaga* were found under bark of *Populus* species, at a sap flow on a recently cut *Populus* sp., and in drift material on a river margin. All individuals of this species were captured in May. Collection method: hand searching subcortical habitat.

Distribution in Canada and Alaska. YT, NT, BC, QC, **NB** (Klimaszewski et al. 2001; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b; Klimaszewski et al. 2008b).

Tribe Athetini Casey, 1910
***Aloconota sulcifrons* (Stephens, 1832)**
Fig 36, Map 36

New Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2208°N, 67.7211°W, 19.IV.2008 (1 ♂, RWC). **Saint John Co.**, Dipper Harbour, 45.1169°N, 66.3771°W, 15.V.2006 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 22.VIII.2006 (1 ♀, RWC); same locality, 1.VIII.2007, 7.IX.2007 (1 ♂, 1 ♀, RWC).

Bionomic Notes. *Aloconota sulcifrons*, an adventive Palaearctic species, was collected from litter and moss near a brook, from compost (corncobs and cornhusks) near a mixed

Map 36. Collection localities in New Brunswick, Canada of *Aloconota sulcifrons*.

forest, and in decaying sea wrack on the upper margin of a sea beach. Two specimens were collected at M.V. light. This species has frequently been collected from caves and was considered a troglophile by Klimaszewski and Peck (1986). However, the presence of this species in other habitat types suggests that *A. sulcifrons* is not a true troglophile. This adventive species appears to be associated with decaying organic material. Adults were collected in April, May, August, and September. Collection method: sifting, M.V. light.

Distribution in Canada and Alaska. QC, **NB** (Gusarov 2003; Majka and Klimaszewski 2008b).

Comments. For distribution of this cosmopolitan species in the USA, see: Klimaszewski and Peck (1986) [as *A. insecta*]; Gusarov 2003; and Majka and Klimaszewski 2008b).

Atheta (s. str.) *aemula* (Erichson, 1839)

Fig 37, Map 37

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1931°N, 67.6825°W, 8.VI.2005 (1 ♂, 1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1927°N, 67.6803°W, 6.VII.2006 (1 ♂, RWC). **Saint John Co.** Dipper Harbour, 45.1169°N, 66.3771°W, 15.V.2006, 30.V.2006, 12.V.2008 (4 ♂, 3 ♀, NBM, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 18.IV.2004, 5.V.2004, 14.V.2005, 21.VI.2004 (1 ♂, 2 ♀, RWC).

Map 37. Collection localities in New Brunswick, Canada of *Atheta aemula*.

Bionomic Notes. *Atheta aemula* is associated with decaying organic material in a variety of habitats. In New Brunswick, adults were collected under dog scat in a river margin (flood plain) forest, in decaying sea wrack on the upper margin of a sea beach, in compost (decaying vegetables) near a mixed forest, and on *Pleurotus* sp. mushroom on a dead standing trembling aspen in a mixed forest. In the United States, this species has been found in flood refuse on a river bank, in rotting wood chips, and on mushrooms (Gusarov 2003). Adults were collected in April, May, June, and July. Collection method: sifting.

Distribution in Canada and Alaska. QC, **NB** (Gusarov 2003).

Atheta annexa Casey, 1910

Fig 38, Map 38

Additional Records. CANADA, New Brunswick, Carleton Co., "Two Mile Brook Fen", 46.3712°N, 67.6772°W, 4.VIII.2006 (1 ♀, RWC). **Saint John Co.**, Fundy Trail Parkway, 45.3972°N, 65.4523°W, 23.VIII.2006 (1 ♂, RWC). **Sunbury Co.**, Lakeville Corner, 45.9007°N, 66.2423°W, 27.VIII.2006 (1 ♂, RWC)**;** Acadia Research Forest, 46.0188°N, 66.3765°W, 18.IX.2007 (1 ♂, AFC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 15.IV.2004, 3.V.2004, 21.VI.2004, 28.IX.2005 (2 ♂, 4 ♀, RWC); Charters Settlement, 45.8340°N, 66.7450°W, 30.IV.2005 (1 ♀, RWC); Charters Settlement, 45.8430°N, 66.7275°W, 8.X.2005 (1 ♂, RWC); Fred-

Map 38. Collection localities in New Brunswick, Canada of *Atheta annexa*.

ericton at Saint John River, 45.9588°N, 66.6254°W, 7.VI.2005 (1 ♀, RWC); 8.4 km W of Tracy off Rt. 645, 45.6821°N, 66.7894°W, 6.V.2008 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, *A. annexa* was found in gilled mushrooms, coral fungi on spruce log, fleshy polypore fungi at base of dead standing *Populus* sp., among decaying vegetables, under spruce bark in wood pile, and in flood debris along a river margin. This species was found in mixed forests, mature red spruce and yellow birch forests, mature red spruce and red maple forests, and in wet alder swamps. Elsewhere this species has been collected from various kinds of decaying organic debris including raccoon dung, decaying fungi, moldy corncobs and from nests of wood-rats, *Neotoma* sp. (Klimaszewski and Peck 1986, Majka and Klimaszewski 2008b). Adults in New Brunswick were collected in April, May, June, August, September and October. Collection method: sifting.

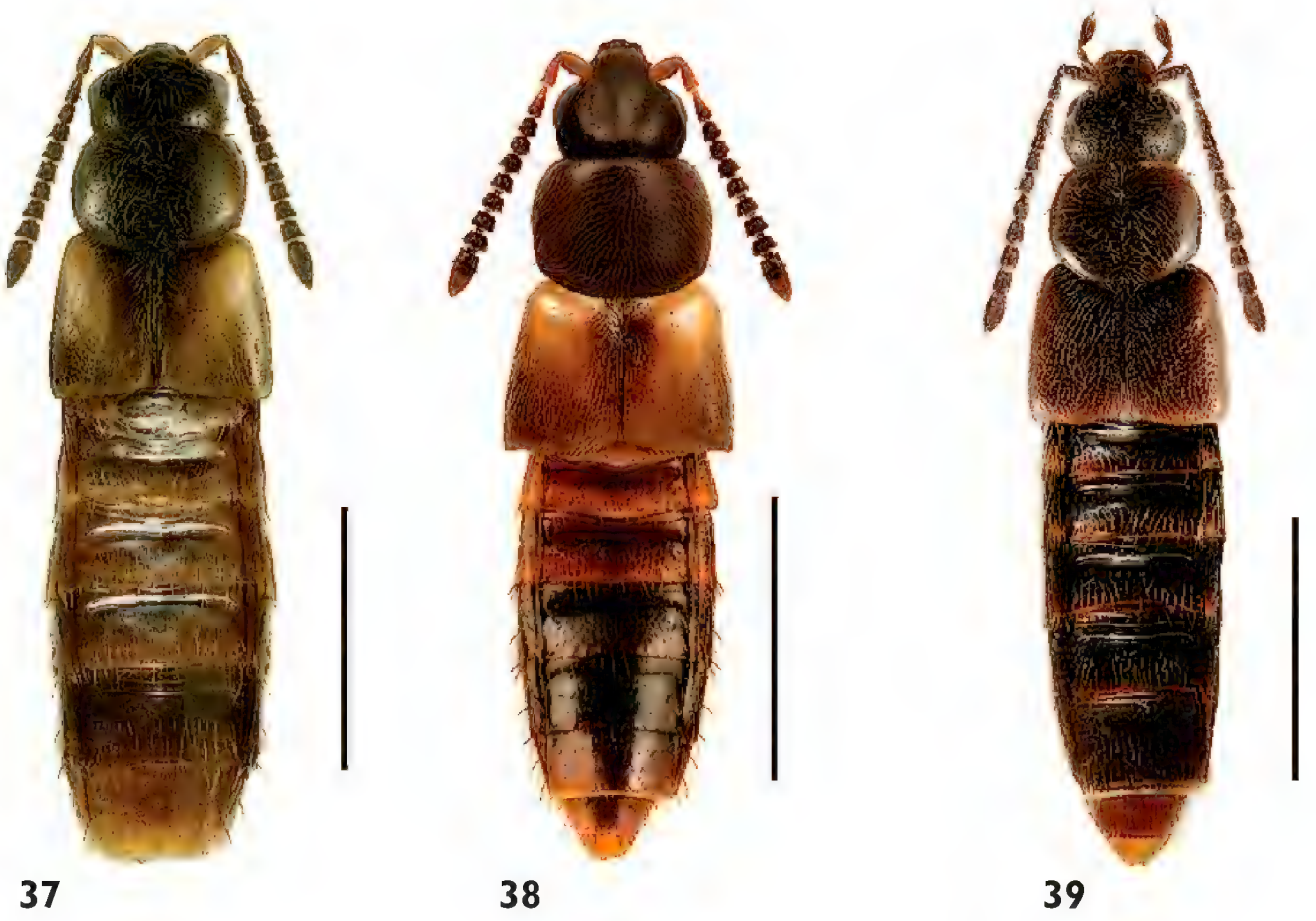
Distribution in Canada and Alaska. ON, QC, NB, NS (Klimaszewski and Peck 1986; Gusarov 2003; Majka and Klimaszewski 2008b)

Atheta (s. str.) *graminicola* (Gravenhorst, 1806)

Fig 39, Map 39

New Record. CANADA, New Brunswick, Albert Co., Shepody NWA, Mary's Point Section, 45.7250°N, 64.6651°W, 31.V.2004 (1 ♀, RWC). **Queens Co.**, Grand Lake near Scotchtown, 45.8762°N, 66.1816°W, 25.IV.2004, R.P. Webster and M.-

Map 39. Collection localities in New Brunswick, Canada of *Atheta graminicola*.



Figures 37–42. 37 *Atheta aemula* **38** *A. annexa* **39** *A. graminicola* **40** *A. irrita* **41** *A. klagesi* **42** *A. longicornis* [37, 40, 42, apical part of abdomen removed]. Scale = 1 mm

A. Giguère (1 ♂, RWC). **Restigouche Co.**, Jacquet River Gorge PNA, 47.7627°N, 66.0270°W, 24.VI.2008 (1 ♀, RWC). **Sunbury Co.**, Portobello Creek NWA, 45.8950°N, 66.2728°W, 11.IV.2006 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 23.IV.2008 (2` ♂, RWC).

Bionomic Notes. This species was collected from drift material (mostly grass litter) on upper margin of a sea beach, in leaf litter at base of a tree in a red oak and maple forest, in leaf litter in the crotch of a silver maple with multiple trunks in early April (this was probably an overwintering site) and among moist leaves on the margin of a vernal pool in a hardwood forest. Two individuals were collected with an aerial net late in the afternoon (15:00–18:00 h) when snow was still present in shaded areas in the forest. In Quebec, *A. graminicola* was collected from leaf litter beside a stream and in *Salix* litter at two localities in the Yukon Territory (Gusarov 2003). Adults were collected in April, May and June. Collection method: sifting, some collected during evening flight.

Distribution in Canada and Alaska. AK, YT, NT, BC, AB, MB, ON, QC, **NB**, NF & LB (Gusarov 2003; Gouix and Klimaszewski 2007).

Atheta (*Dimetrota*) *hampshirensis* Bernhauer, 1909

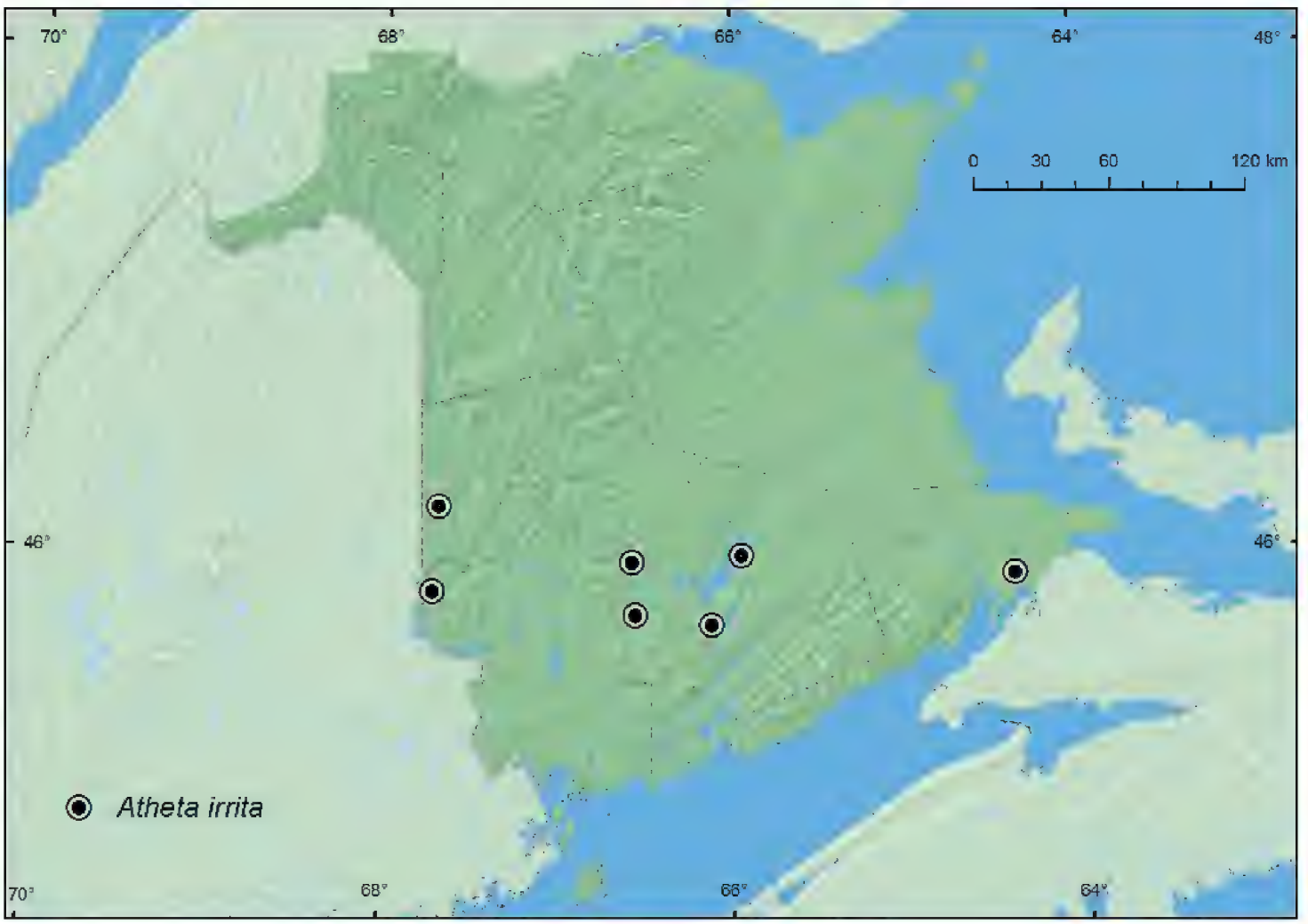
Atheta hampshirensis was newly recorded from New Brunswick by Majka and Klimaszewski (2008b) based on specimens collected at Mary's Point (Albert Co.). However, this species was first recorded from New Brunswick by Klimaszewski et al. (2005) from the Acadia Research Forest (Sunbury Co.).

Atheta irrita Casey, 1911

Fig 40, Map 40

New Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 20.VI.2006, 23.VI.2006 (3 ♂, 1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1927°N, 67.6803°W, 6.VII.2006 (2 ♂, RWC). **Queens Co.**, McAlpines near Upper Hampstead Rd., 45.7250°N, 66.1200°W, 26.VI.2008, S. Makepeace and R.P. Webster (1 ♂, RWC); Rees, near Grand Lake, 46.0016°N, 65.9466°W, 29.V.2007, S. Makepeace and R.P. Webster (1 ♂, NBM). **Sunbury Co.**, near Sunpoke Lake, 45.7658°N, 66.5546°W, 20.VI.2007 (1 ♀, RWC). **Westmorland Co.**, Sackville, near Ogden Mill, 45.9216°N, 64.3893°W, 12.V.2006, S. Makepeace (2 ♂, 3 ♀, NBM, RWC). **York Co.**, Graham Corner, 45.8565°N, 67.7083°W, 26.VI.2007, S. Makepeace and R.P. Webster (1 ♂, NBM); Marysville, 45.9750°N, 66.5700°W, 22.VI.2007, S. Makepeace and R.P. Webster (1 ♀, NBM).

Bionomic Notes. *Atheta irrita* was a common inhabitant of the nests of barred owls, which nest in tree holes (usually in large trees) or artificial nest boxes. Adults



Map 40. Collection localities in New Brunswick, Canada of *Atheta irrita*.

occurred in the nest contents that usually consisted of rich decaying organic material with bones, fur, owl pellets, portions of dead prey items (mice, squirrels, small birds), and the contents often had a strong urine smell. This species was also found in the nest contents of the great horned owl. Majka et al. (2006a) reported this species from the nests of the boreal owl and northern saw-whet owl in Nova Scotia. *Atheta irrita* was also found at several sites in New Brunswick in *Pleurotus* sp. (oyster mushrooms) in the early stages of decay on dead standing trembling aspen trees in oak forests and mixed forests. This data suggests that *A. irrita* is associated with decaying organic material on standing trees. Adults were collected in May and June. Collection method: sifting.

Distribution in Canada and Alaska. QC, **NB**, NS (Majka et al. 2006a; Gouix and Klimaszewski 2007).

Atheta (*Pseudota*) *klagesi* Bernhauer, 1909

Fig 41, Map 41

Additional Records. CANADA, **New Brunswick**, **Albert Co.**, Shepody NWA, Germantown Section, 45.7100°N, 64.7540°W, 12.IX.2004 (1 ♂, RWC). **Carleton Co.**, Meduxnekeag River Valley Nature Preserve, 46.1883°N, 67.6745°W, 9.VIII.2005, 14.IX.2005, M.-A. Giguère and R.P. Webster (5 ♂, 5 ♀, LFC, RWC); "Bell Forest",

Map 41. Collection localities in New Brunswick, Canada of *Atheta klagesi*.

46.2200°N, 67.7231°W, 16.IX.2006 (1 ♂, RWC). **Restigouche Co.**, 9.0 km S of Saint Arthur, 47.8177°N, 66.7561°W, 14.VI.2006 (1 ♀, RWC); Jacquet River Gorge PNA, 47.7491°N, 66.1114°W, 24.VI.2008 (1 ♀, NBM). **Saint John Co.**, Fundy Trail Parkway, 45.3972°N, 65.4523°W, 23.VIII.2006 (1 ♂, RWC). **Sunbury Co.**, Acadia Research Forest, 45.9799°N, 66.3394°W, 18.VI.2007, 17.VIII.2007 (2 ♂, AFC); Acadia Research Forest, 46.0188°N, 66.3765°W, 17.VIII.2007 (1 ♂, AFC); Acadia Research Forest, 45.9816°N, 66.3374°W, 18.VI.2007 (1 ♂, 1 ♀, AFC). **York Co.**, Charters Settlement, 45.8286°N, 66.7365°W, 6.IX.2005, 19.IX.2005 (2 ♂, RWC); same locality data, 6.VII.2006 (1 ♀, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 22.VIII.2005, 19.V.2006 (5 ♂, 1 ♀, RWC); same locality data, 15.IV.2004, 27.VIII.2005, 27.IV.2008 (2 ♀, 1 sex undetermined, LFC, RWC); Fredericton, Odell Park, 45.9570°N, 66.6695°W, 7.IX.2005 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, *A. klagesi* was found in a variety of fungi, including gilled mushrooms, fleshy polypore fungi, inside birch polypore (*Piptoporus betulinus* (Bull.) Karst.), and in decaying coral fungi. Adults were also found in compost (decaying vegetables and moldy corncobs) and inside a well rotted fungus covered log. This species occurred in hardwood forests, eastern white cedar swamps, red spruce and yellow birch (*Betula alleghaniensis* Britt.) forests, red spruce and red maple forests, hemlock forests and mixed forests. This species was reported from similar habitats in Majka and Klimaszewski (2008b). Adults were captured in April, June, July, August, and September. Collection method: sifting.

Distribution in Canada and Alaska. YT, QC, NB (Gusarov 2003; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b; Klimaszewski et al. 2008b). *Atheta klagesi* was first reported from New Brunswick by Majka and Klimaszewski (2008b) from specimens collected by C.G. Majka at Mary's Point (Albert Co.) and R.P. Webster in New Maryland (presumably Charters Settlement) (York Co.). The records above show that *A. klagesi* is probably widely distributed in New Brunswick.

Atheta (*Chaetida*) *longicornis* (Gravenhorst, 1802)

Fig 42, Map 42

New Records. CANADA, New Brunswick, Northumberland Co., Burnt Church near Burnt Church River, 47.2075°N, 65.1471°W, 7.VIII.2005 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 14.V.2005, 5.V.2006, 26.IX.2007 (2 ♂, 2 ♀, RWC); same locality data, 23.IV.2008, 9.V.2008 (1 ♂, 1 ♀, 1 sex undetermined, RWC); Charters Settlement, 45.8430°N, 66.7275°W, 8.X.2005 (1 ♂, RWC).

Bionomic Notes. This species was collected from cow dung, compost (decaying vegetables), and in decaying mushrooms. Flying individuals were collected with a net between 15:00 and 16:00 h during warm afternoons in early spring. In other areas, *A. longicornis* has been found associated with dung and various rotting organic materials (Klimaszewski et al. 2007a). Adults were captured in April, May, August, September,

Map 42. Collection localities in New Brunswick, Canada of *Atheta longicornis*.

and October in New Brunswick. This species probably overwinters in the adult stage. Collection method: sifting.

Distribution in Canada and Alaska. QC, **NB**, NS (Klimaszewski et al. 2007a).

Atheta novaescotiae Klimaszewski & Majka (in Klimaszewski et al., 2006b)

Fig 43, Map 43

Additional Records. CANADA, **New Brunswick**, **Albert Co.**, Shepody NWA, 45.7250°N, 64.6651°W, 31.V.2004, 6.VII.2004 (1 ♂, 1 ♀, 1 sex undetermined, LFC, RWC). **Saint John Co.**, Dipper Harbour, 45.1169°N, 66.3771°W, 30.V.2006 (3 ♂, 3 ♀, 1 sex undetermined, RWC); Chance Harbour off Cranberry Head Road, 45.1357°N, 66.3451°W, 12.V.2008 (1 ♂, RWC).

Bionomic Notes. In New Brunswick, *A. novaescotiae* occurred in decaying sea wrack on sand and gravel with *Aleochara* (*Emplenota*) *litoralis* (Mäklin) on the upper margin of a sea beach. This species was reported from similar habitats in Klimaszewski et al. (2006). Adults were collected in May and July. Collection method: sifting.

Distribution in Canada and Alaska. NB, NS, NF & LB (Klimaszewski et al. 2006; Majka and Klimaszewski 2008b; Majka and Klimaszewski 2008c). *Atheta novaescotiae* was first reported as new to New Brunswick by Majka and Klimaszewski (2008b) and Majka and Klimaszewski (2008c) from specimens collected at Mary's

Map 43. Collection localities in New Brunswick, Canada of *Atheta novaescotiae*.

Point (Alberta Co.) on 12 May 2007 and 12 August 2004, respectively. The 31 May 2004 record from Mary's Point establishes an earlier record for New Brunswick. The presence of the species west of Saint John (Chance Harbour) indicates a wider distribution for this species along the Fundy Coast of New Brunswick.

***Atheta* (*Dimetrota*) *prudhoensis* (Lohse et al., 1990)**
Fig 44, Map 44

Additional Records. CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 15.IX.2004, 14.IX.2005 (1 ♂, 1 ♀, RWC). **Restigouche Co.**, Mount Carleton Provincial Park, Mount Sagamook, 2000 ft. elev., 47.1112°N, 66.8599°W, 2.IX.2006 (1 ♂, 1 ♀, RWC). **York Co.**, Charters Settlement, 45.8430°N, 66.7275°W, 25.IX.2004, 6.X.2005 (6 ♂, 6 ♀, RWC); Charters Settlement, 45.8286°N, 66.7365°W, 19.IX.2005 (1 ♀, RWC); Charters Settlement, 45.8395°N, 66.7391°W, 21.VI.2004, 5.IX.2006 (1 ♂, 1 ♀, RWC).

Bionomic Notes. *Atheta prudhoensis* was typically found in decaying gilled mushrooms in mixed forests in New Brunswick. A few adults were also found in compost (decaying vegetables and decaying corncobs and cornhusks). Majka and Klimaszewski (2008b) reported *A. prudhoensis* from *Russula viresens* (gilled mushroom) in a white spruce forest. Gusarov (2003) found this species in litter in a mixed forest in Vermont.

Map 44. Collection localities in New Brunswick, Canada of *Atheta prudhoensis*.

Adults were collected during June, September, and October in New Brunswick. Collection method: sifting.

Distribution in Canada and Alaska. AK, YT, ON, QC, NB, NS (Lohse et al. 1990; Gusarov 2003; Majka and Klimaszewski 2008b). *Atheta prudhoensis* was first recorded from New Brunswick by Majka and Klimaszewski (2008b) from a specimen collected at Mary's Point (Albert Co.). The above records indicate that this species is probably widespread in the province.

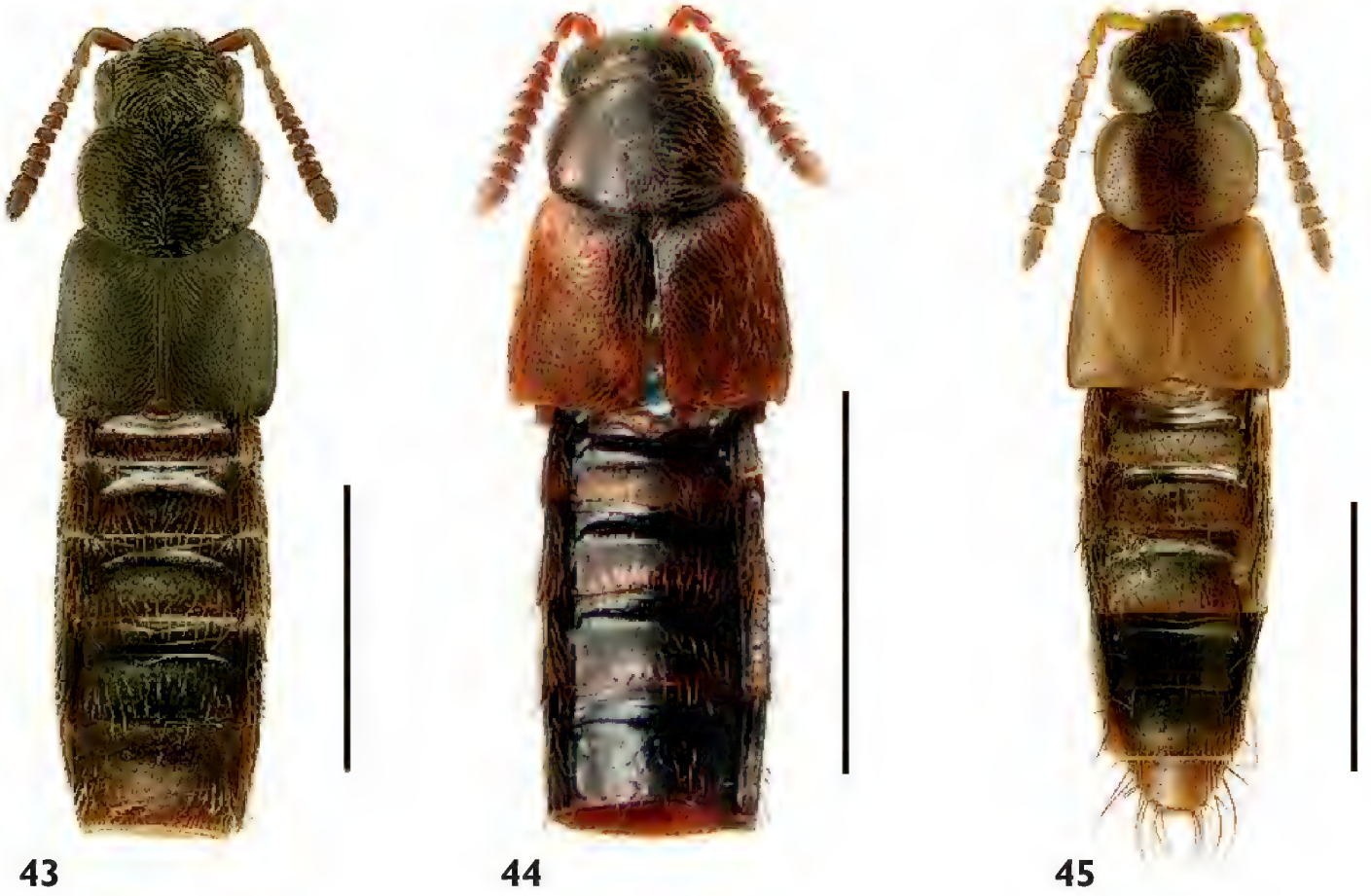
Atheta (*Metadimetrota*) *savardae* Klimaszewski & Majka, 2007

Fig 45, Map 45

New Records. CANADA, New Brunswick, Sunbury Co., Acadia Research Forest, 45.9816°N, 66.3374°W, 19–27.IX.2007 (1 ♂, RWC); Acadia Research Forest, 46.0188°N, 66.3765°W, 19–27.IX.2007 (1 ♂, 1 ♀, AFC). **Restigouche Co.**, Mount Carleton Provincial Park, Mount Sagamook, 2000 ft. elev., 47.1112°N, 66.8599°W, 2.IX.2006 (1 ♂, RWC). **Sunbury Co.**, **York Co.** Charters Settlement, 45.8286°N, 66.7365°W, 5.X.2005 (1 ♂, RWC).

Bionomic Notes. In New Brunswick, some adults of *A. savardae* were collected from decaying mushrooms in a mixed forest and a mature red spruce and eastern white cedar forest. Others were collected in pitfall traps in a mature red spruce and red ma-

Map 45. Collection localities in New Brunswick, Canada of *Atheta savardae*.



Figures 43–48. 43 *Atheta novaescotiae* **44** *A. prudhoensis* **45** *A. savardae* **46** *Dalotia coriaria* **47** *Dinaraea angustula* **48** *Dochmonota rudiventris* [43, 44, 48, apical part of abdomen removed]. Scale = 1 mm

ple forest and an 8.5-year-old regenerating mixed forest. In Nova Scotia, this species was collected from pitfall traps in a variety of deciduous and coniferous forest types (Klimaszewski and Majka 2007). This species was collected in September and October. Collection method: sifting, pitfall traps.

Distribution in Canada and Alaska. QC, **NB**, NS (Klimaszewski and Majka 2007; Gouix and Klimaszewski 2007).

Dalotia coriaria (Kraatz, 1856)

Fig 46, Map 46

New Records. CANADA, New Brunswick, Saint John Co., Saint John, Taylor's Island, 45.2238°N, 66.1265°W, 24.VIII.2004 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 13.IX.2004, 16.X.2004, 10.VII.2005, 6.IX.2005, 22.VIII.2006 (5 ♂, 3 ♀, RWC).

Bionomic Notes. Adults of this cosmopolitan and adventive species were collected under decaying seaweed (sea wrack) on a sea beach and in decaying vegetables adjacent to a mixed forest in New Brunswick. In other areas, this species has been reported from forest litter and various rotting organic substances such as grass heaps, carrion, and mushrooms (Klimaszewski et al. 2007a). Adults were collected in July, August, September, and October. Collection method: sifting.

Map 46. Collection localities in New Brunswick, Canada of *Dalotia coriaria*.

Distribution in Canada and Alaska. AB, ON, **NB** (Klimaszewski et al. 2007a; Gouix and Klimaszewski 2007).

***Dinaraea angustula* (Gyllenhal, 1810)**
Fig 47, Map 47

New Records. CANADA, New Brunswick, Albert Co., Shepody NWA, Germantown Section, 45.7056°N, 64.7642°W, 17.V.2004 (1 ♀, NBM). **Carleton Co.**, Meduxnekeag River Valley Nature Preserve, 46.1965°N, 67.6340°W, 11.V.2005, M.-A. Giguère and R.P. Webster (1 ♀, RWC). **Queens Co.**, Grand Lake, near Scotchtown, 45.8762°N, 66.1816°W, 30.IV.2006 (1 ♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 22.VIII.2006, 17.IX.2006, 5.IX.2007, 23.IV.2008 (2 ♂, 2 ♀, RWC).

Bionomic Notes. In Canada, most previously reported specimens of this adventive species were captured in pitfall and Luminoc pitfall traps in or adjacent to agricultural fields (Klimaszewski et al. 2007a). However, this species is not restricted to agricultural habitats in Canada. In New Brunswick, this species was captured in marsh litter in a cattail and sedge marsh, in leaf litter along the margin of a vernal pond in a mixed forest, in drift material along a lake shore, and from among decaying corncobs and cornhusks in a forested residential area adjacent to a mixed forest. This species was

Map 47. Collection localities in New Brunswick, Canada of *Dinaraea angustula*.

collected in April, May, August, and September. This species probably overwinters in the adult stage. Collection method: sifting.

Distribution in Canada and Alaska. AB, QC, **NB**, ON, PE, NS (Klimaszewski et al. 2007a; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b).

Dochmonota rudiventris (Eppelsheim, 1886)

Fig 48, Map 48

New Records. CANADA, New Brunswick, Carleton Co., near Hovey Hill Protected Natural Area, 46.1152°N, 67.7632°W, 10.V.2005, 14.V.2006 (5 ♂, 5 ♀, RWC). **Queens Co.**, W of Jemseg near "Trout Creek", 45.8231°N, 66.1245°W, 3.IV.2006 (1 ♂, RWC); Grand Lake near Scotchtown, 45.8762°N, 66.1817°W, 25.V.2006 (1 ♀, RWC). **York Co.**, Slagundy Dry Ponds, 45.8596°N, 67.1849°W, 8.VII.2006 (1♀, RWC).

Bionomic Notes. Most specimens of *D. rudiventris* from New Brunswick were found in moist leaf litter near the margins of vernal ponds in mixed forests and silver maple swamps (flood plain forest) similar to habitats reported from Europe in Majka and Klimaszewski (2008b). Adults were captured in April, May and July. Collection method: sifting.

Distribution in Canada and Alaska. YT, NT, QC, **NB**, NF & LB (Gusarov 2003; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b). *Dochmonota rudiventris* is probably transcontinental in distribution in Canada and may be a Holarctic species.

Map 48. Collection localities in New Brunswick, Canada of *Dochmonota rudiventris*.

***Earota dentata* (Bernhauer, 1906)**
Fig 49, Map 49

Additional Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2152°N, 67.7190°W, 1.VI.2005, M.-A. Giguère and R.P. Webster (1 ♀, RWC). **Saint John Co.,** Saint John, Taylor's Island, 45.2238°N, 66.1265°W, 24.VIII.2004 (2 ♂, RWC). **Sunbury Co.**, Acadia Research Forest, 45.9799°N, 66.3394°W, 21.VII.1999, G. Gesner (1 ♂, AFC); Burton, SW of Sunpoke Lake, 45.7575°N, 66.5736°W, 17.IV.2005 (1 ♂, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°W, 28.IV.2004, 9.V.2005 (2 ♂, RWC); same locality, 5.IX.2006, 29.VIII.2007, 26.IX.2007 (3 ♂, RWC); same locality, 23.IV.2008 (2 ♀, RWC).

Bionomic Notes. In New Brunswick, adults of *E. dentata* were collected from leaf litter near the margin of a brook in a red maple swamp, the margin of a brook shaded by alders in a mixed forest, and under decaying seaweed (sea wrack) on a sea beach. Several adults were collected from among corncobs and cornhusks on the margin of a mixed forest. Several adults were collected early in the spring (April) during their dispersal flights using an aerial net. Elsewhere this species has been recorded from leaf litter, river debris, and pocket gopher (*Geomys* sp.) burrows (Gusarov 2002b). Adults were collected in April, May, June, July, August, and September. Collection method: sifting, some collected with net during evening flight.

Map 49. Collection localities in New Brunswick, Canada of *Earota dentata*.

Distribution in Canada and Alaska. AK, YT, BC, AB, MB, ON, QC, NB, NS (Gusarov 2002b; Klimaszewski and Winchester 2002; Klimaszewski et al. 2007b; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b; Klimaszewski et al. 2008b). This transcontinental species was first recorded from New Brunswick in Klimaszewski et al. (2005) from the Acadia Research Forest (Sunbury Co.), although it was not noted as being new to the province.

Geostiba (*s. str.*) *circellaris* (Gravenhorst, 1806)

Fig 50, Map 50

New Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2152°N, 67.7190°W, 11.V.2006, M.-A. Giguère and R.P. Webster (1 ♂, 1 sex undetermined, RWC); "Bell Forest" 46.2146°N, 67.7206°W, 12.IV.2007 (1 ♂, 1 sex undetermined, RWC); Meduxnekeag River Valley Nature Preserve, 46.1931°N, 67.6825°W, 8.VI.2005 (1 ♂, RWC). **Queens Co.**, W of Jemseg near "Trout Creek", 45.8231°N, 66.1245°W, 3.IV.2006 (1 ♂, 2 ♀, RWC); Cambridge, "Trout Creek", 45.8240°N, 66.1220°W, 4.VI.2004 (1 ♀, LFC). **Saint John Co.**, Musquash, 45.1837°N, 66.3376°W, 7.V.2006 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, this adventive species was found along river margins in flood debris and drift material. Adults were also collected from leaf litter in

Map 50. Collection localities in New Brunswick, Canada of *Geostiba circellaris*.

the crotch of a silver maple with multiple trunks in early April in a floodplain forest (prior to the normal spring flood). This was presumably an overwintering site. Adults were collected in April, May and June. Collection method: sifting.

Distribution in Canada and Alaska. NB, NF & LB (Gusarov 2002a; Gouix and Klimaszewski 2007).

Lypoglossa franclemonti Hoebeke, 1992

Fig 51, Map 51

New Records. CANADA, New Brunswick, Restigouche Co., MacFarlane Brook Protected Natural Area, 47.6018°N, 67.6263°W, 25.V.2007 (1 ♀, RWC). **Saint John Co.**, Dipper Harbour, 45.1176°N, 66.3806°W, 24.VIII.2006, 12.IX.2006 (2 ♂, 1 ♀, 1 sex undetermined, RWC); Dipper Harbour, 45.1169°N, 66.3771°W, 7.V.2006, 15.V.2006 (2 ♀, 2 sex undetermined, RWC).

Bionomic Notes. In New Brunswick, *L. franclemonti* were collected from decaying sea wrack under alders on the upper margin of a sea beach, on decaying gilled mushrooms in a red spruce forest adjacent to a salt marsh, and in moss and leaves under alders in an old-growth eastern white cedar forest. Gusarov (2004) reported this species as common in forest litter and moss on forest floor. In New Brunswick, adults were collected in May, August, and September, suggesting that adults overwinter. Collection method: sifting.

Map 51. Collection localities in New Brunswick, Canada of *Lypoglossa franclemonti*.

Figures 49–54. 49 *Earota dentata* **50** *Geostiba circellaris* **51** *Lypoglossa franclemonti* **52** *Mocyta breviuscula* **53** *Philhygra angusticauda* **54** *P. botanicarum* [53, 54, apical part of abdomen removed]. Scale = 1 mm

Distribution in Canada and Alaska. NT, AB, MB, ON, QC, **NB,** NS (Gusarov 2004; Gouix and Klimaszewski 2007).

***Mocyta breviuscula* (Mäklin, 1852)**
Fig 52, Map 52

New Records. CANADA, New Brunswick, Restigouche Co., 9 km S of Saint Arthur, 47.8177°N, 66.7561°W, 14.VI.2006 (1 ♀, RWC).

Bionomic Notes. In New Brunswick, this species was found in an eastern white cedar swamp in sphagnum and litter. Collection method: sifting.

Distribution in Canada and Alaska. AK, YT, BC, **NB**, NS (Gusarov 2003; Lohse et al. 1990; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008; Klimaszewski et al. 2008b).

***Philhygra angusticauda* (Bernhauer, 1909)**
Fig 53, Map 53

New Records. CANADA, New Brunswick, Restigouche Co., Little Tobique River near Red Brook, 47.4465°N, 67.0689°W, 13.VI.2006 (2 ♂, 1 ♀, RWC).

Map 52. Collection localities in New Brunswick, Canada of *Mocyta breviuscula*.

Map 53. Collection localities in New Brunswick, Canada of *Philhygra angusticauda*.

Bionomic Notes. In New Brunswick, this species was found in an alder swamp near a river in debris on muddy soil near a brook flowing into the river. Collection method: sifting.

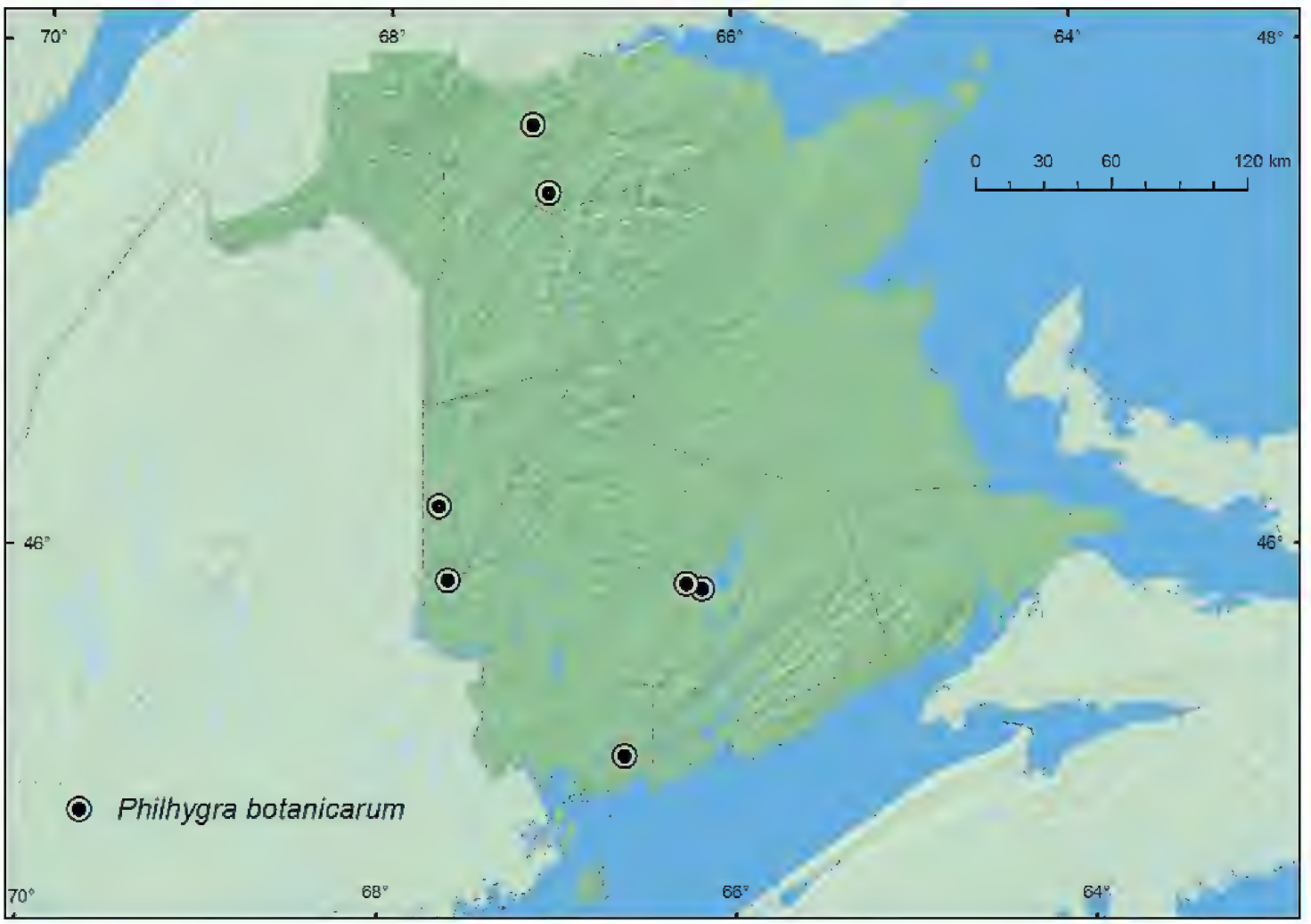
Distribution in Canada and Alaska. AK, BC, **NB** (Klimaszewski and Winchester 2002; Gouix and Klimaszewski 2007).

Philhygra botanicarum Muona, 1983

Fig. 54, Map 54

CANADA, New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1976°N, 67.6850°W, 4.V.2006 (1 ♂, RWC). **Charlotte Co.**, near New River, 45.2118°N, 66.6179°W, 2.VI.2006 (1 ♂, 4 ♀, NBM, RWC). **Queens Co.**, Grand Lake near Scotchtown, 45.8762°N, 66.1817°W, 12.V.2004 (1 ♀, RWC). **Restigouche Co.**, Little Tobique River near Red Brook, 47.4465°N, 67.0689°W, 13.VI.2006 (1 ♀, RWC); Jacquet River Gorge PNA, 47.7146°N, 67.1644°W, 24.VI.2008 (1 ♂, 1 ♀, RWC). **Sunbury Co.,** Portobello Creek NWA, 45.8955°N, 66.2725°W, 17.VII.2004 (1 ♂, LFC). **York Co.**, W of Canterbury near "Browns Mt. Fen", 45.9033°N, 67.6260°W, 2.V.2005, M.-A. Giguère and R.P. Webster (1 ♂, CNC).

Bionomic Notes. *Philhygra botanicarum* was typically found in moist leaves (often on muddy soil) near the margins of vernal ponds or small brooks in alder swamps or mixed forests. Some adults were found in drift material on a lake shore and in



Map 54. Collection localities in New Brunswick, Canada of *Philhygra botanicarum*.

moist leaves under a sap flow from a recently cut yellow birch. Nothing was previously known about the bionomics of this species. Adults were collected in May, June and July. Collection method: sifting, U.V. light trap.

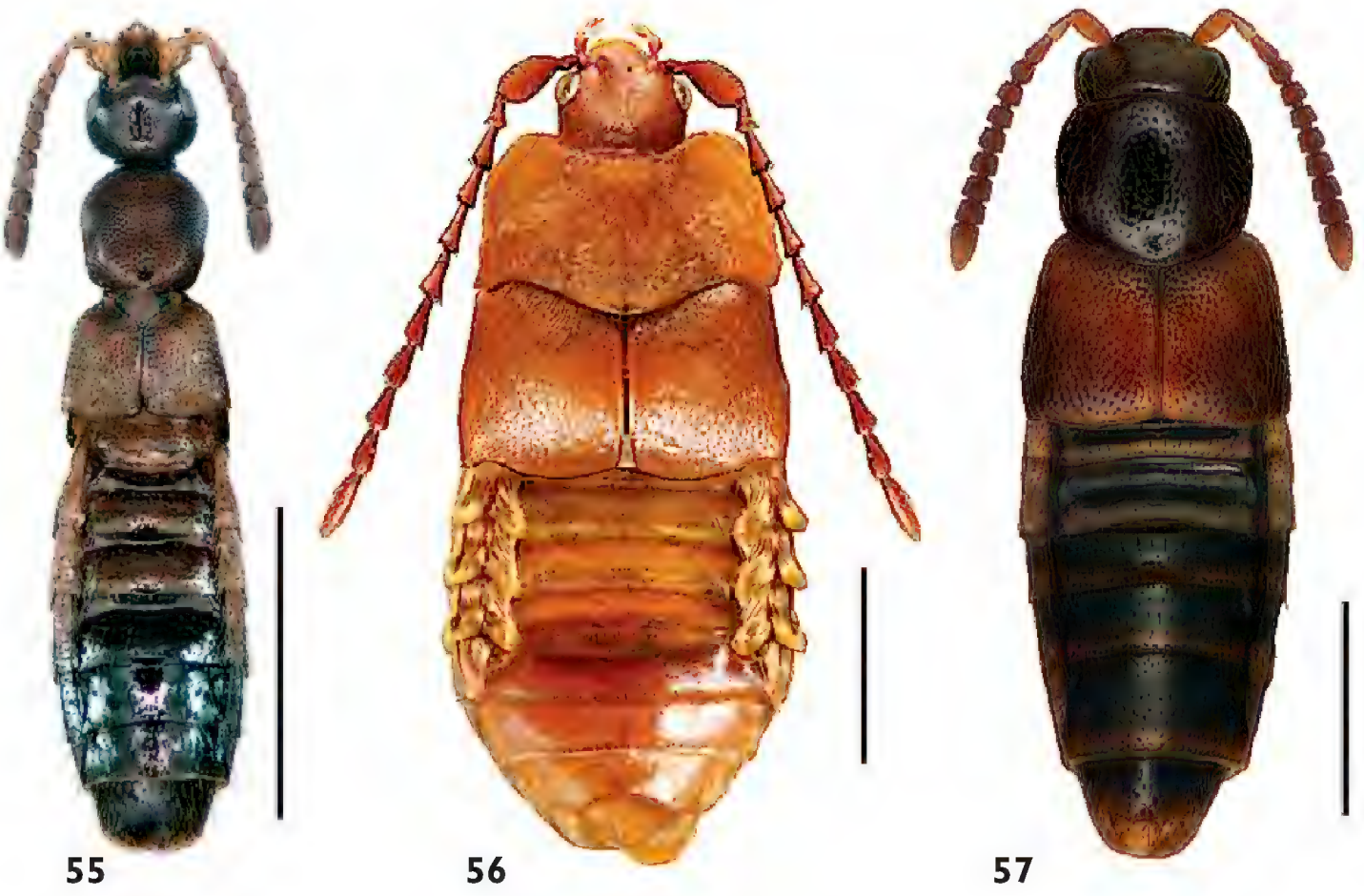
Distribution in Canada and Alaska. BC, YT, ON, **NB**, NS, NF & LB (Muona 1983; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b; Klimaszewski et al. 2008b)

Tribe Lomechusini Fleming, 1821
***Drusilla canaliculata* (Fabricius, 1787)**
Fig 55, Map 55

New Records. CANADA, New Brunswick, Carleton Co., "Bell Forest", 46.2146°N, 67.7206°W, 6.V.2007 (1 ♂, NBM). **Queens Co.**, Bayard at Nerepis River, 45.4426°N, 66.3280°W, 25.V.2008 (1 ♂, 15+ observed, some under small cobblestones, NBM). **Sunbury Co.**, Acadia Research Forest, 46.0188°N, 66.3765°W, 18.VI.2007 (1 ♂, AFC). **York Co.**, Fredericton, at Saint John River, 45.9588°N, 66.6254°W, 4.VII.2004, 7.VI.2005 (4 ♂, 7 sex undetermined, NBM, RWC); Nashwaaksis River at Rt. 105, 45.9850°N, 66.6900°W, 6.V.2006 (1 ♀, RWC).

Bionomic Notes. Most records of *D. canaliculata* from New Brunswick suggest that this is a riparian species associated with river margin habitats. Most speci-

Map 55. Collection localities in New Brunswick, Canada of *Drusilla canaliculata*.



Figures 55–57. 55 *Drusilla canaliculata* **56** *Xenodusa reflexa* **57** *Zyras obliquus*. Scale = 1 mm

mens were collected from flood debris and drift material along river margins. Many adults were observed on the surface of gravel near the water's edge on a gravel bar at the Nerepis River. Some individuals at this site were also found under small cobblestones. One individual was collected from moss near the margin of a brook in a mature red spruce and red maple forest. This species is considered to be adventive from Eurasia where it is common in natural habitats, although in North America most records of this species have been from disturbed habitats (Gusarov 2003). In New Brunswick, this species was collected in May, June, and July. Collection method: sifting, hand collecting (turning cobblestones and pebbles on river margin).

Distribution in Canada and Alaska. AK, ON, QC, **NB** (Gusarov 2003, Gouix and Klimaszewski 2007)

***Xenodusa reflexa* (Walker, 1866)**
Fig 56, Map 56

New Records. CANADA, New Brunswick, Kent Co., Kouchibouguac Nat. Park, 30.VII.1978, I. Smith (2 sex undetermined, CNC).

Distribution in Canada and Alaska. BC, AB, SK, MB, ON, QC, **NB**, NS (Gusarov 2003; Gouix and Klimaszewski 2007; Majka and Klimaszewski 2008b).

Map 56. Collection localities in New Brunswick, Canada of *Xenodusa reflexa*.

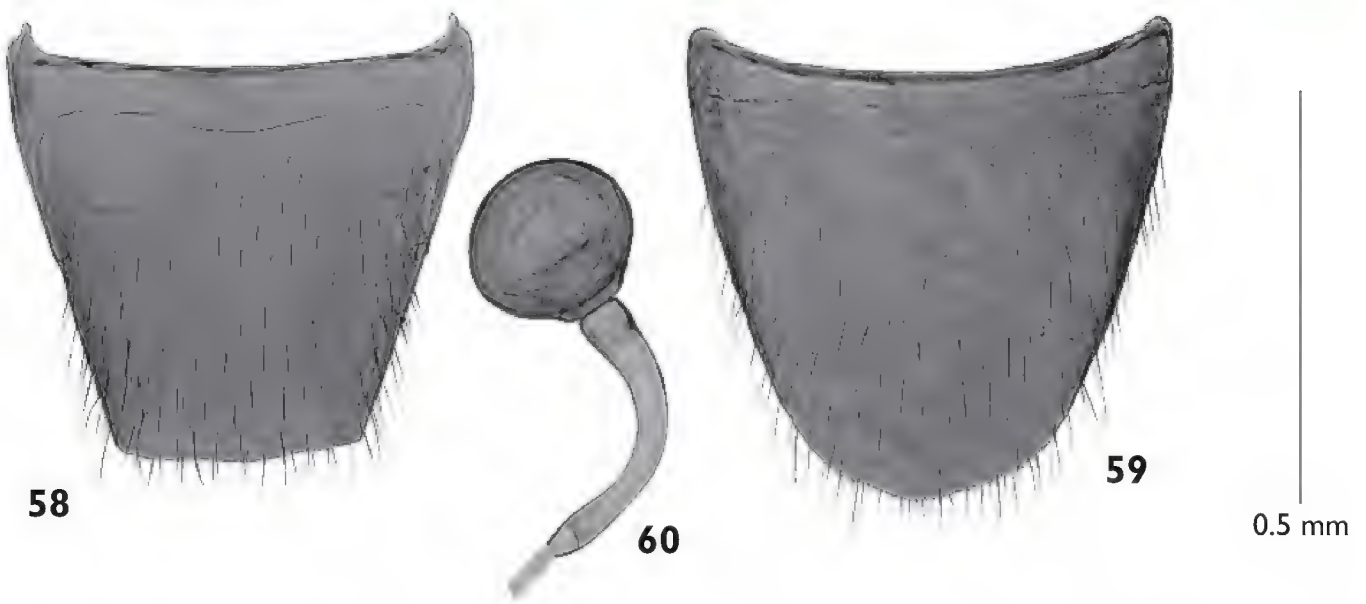
Zyras (*s. str.*) *obliquus* (Casey, 1894)

Fig 57, Map 57

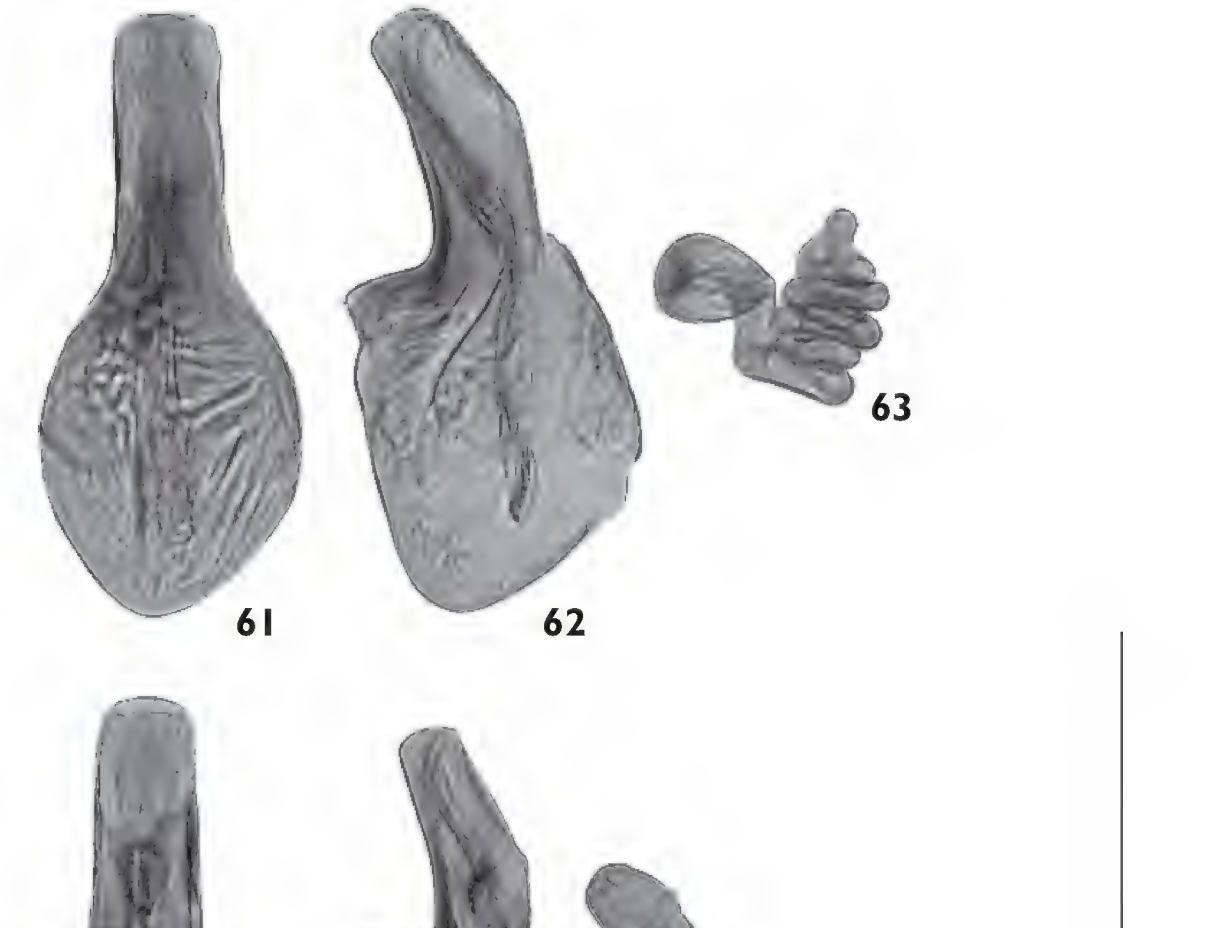
New Records. CANADA, New Brunswick, Kent Co., Kouchibouguac Nat. Park, 16.VI.1978, D.B. Lyons (1 sex undetermined, CNC).

Distribution in Canada and Alaska. BC, AB, MB, ON, QC, **NB** (Klimaszewski et al. 2005; Gouix and Klimaszewski 2007).

Map 57. Collection localities in New Brunswick, Canada of *Zygras obliquus*.



Figures 58–60. Genital structures of *Amarochara formicina*: **58** tergite 8 **59** sternite 8 **60** spermatheca. Scale = 0.5 mm.



Figures 61–69. Genital structures of *Myllaena* species: 61-63 (*M. kaskaskia*): **61** median lobe of aedeagus in dorsal view **62** median lobe of aedeagus in laterial view **63** spermatheca; 64–66 (*M. procidua*): **64** median lobe of aedeagus in dorsal view **65** median lobe of aedeagus in lateral view **66** spermatheca; 67–69 (*M. vulpina*): **67** median lobe of aedeagus in dorsal view **68** median lobe of aedeagus in lateral view **69** spermatheca. Scale = 0.5 mm.

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APPENDIX I

A variety of collection methods employed in this study are listed below.

Sifting. Leaf litter, moss, or other kinds of debris were placed in a large plastic box and concentrated by removing the larger debris. Most Staphylinidae, including the Aleocharinae, move to the bottom of the container to avoid light and are easily collected with an aspirator as they become active (some species may take more than 10 minutes to become active). This method was very effective for collecting species from forest litter, grass and mosses in marshes and bogs, patches of debris in sandy areas, flood debris and drift material along river and lake margins, seaweed along sea beaches, compost, rotting logs, etc. Aleocharinae and other Staphylinidae were easily collected from various kinds of fungi by placing them in the plastic box, breaking the fungi into pieces and then collecting the beetles as they moved. This was the primary method employed for collecting most of the Aleocharinae reported in this study.

Treading. Treading was used in wetland habitats, such as marshes, fens and wetter bogs. Floating or emergent vegetation, saturated muddy or peaty soils, and saturated sphagnum were pressed under water and beetles that floated to the surface were collected.

Mercury vapour light. Some Aleocharinae were collected from a white sheet lighted by a mercury vapour (M.V.) light, powered by a portable generator at remote sites. This method was especially effective for collecting small species that normally would have been lost among the many larger taxa such as Lepidoptera that are normally caught in large numbers in light traps.

Hand Collecting. Aleocharinae were collected from habitats such as gravel and cobblestone margins of streams and rivers by turning over pebbles, cobblestones, or large rocks and collecting beetles as they moved. Aleocharinae were collected from subcortical habitats by first removing bark and placing the pieces into a plastic box, checking for beetles on the surface of the log or tree trunk, and then brushing debris from the surface of the log into the container. The material in the box was then sifted using the method described above.

Evening Flight Collections. Many species of Aleocharinae and other Staphylinidae fly (sometimes in large numbers) during the late afternoon and early evening (15:00 to 18:00 h) on warm days with very light winds in early spring and into the early summer (presumably these are dispersal flights). These species are easily collected by sweeping a butterfly net with a very fine mesh in areas where the beetles are flying (often along an open trail, forest margin, or river margin). Some Aleocharinae species in New Brunswick were collected on warm days in late March and April when a snow pack was still present.